

STATEMENT OF QUALIFICATIONS

Meteorological Analysis and Monitoring Services for the Wind Energy Industry

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SECTION 1: OVERVIEW OF COMPANY AND SERVICES

Enviroplan Consulting is one of the largest exclusively meteorological and air pollution consulting companies in the U.S. This Statement of Qualifications describes our resources for providing meteorological equipment, monitoring services, and wind resource analyses and other meteorological analyses for the wind energy industry. Since 1972, we have conducted over 3,000 meteorological and air pollution studies and monitoring programs for over 350 industrial and governmental clients.

Our current staff members are located in 15 offices and project locations as shown in Figure 1. We have provided our meteorological services in 26 states (Figure 2), Puerto Rico, and two foreign countries.

Our meteorological monitoring services for the wind energy industry include:

- Site evaluation
- System design
- Meteorological system assembly
- Meteorological sensor calibration services
- Equipment supply
- Installation
- Operation and maintenance
- Data acquisition, analysis and reporting
- Quality assurance
- Proprietary portable power supply systems for extended operation of lidar and sodar systems at remote locations

Our wind assessment services include:

- Initial site prospecting for wind farms
- Long-range radar and microwave interference studies for wind turbines

- Identifying sites satisfying wind resource, transmission line infrastructure, and other requirements
- Analyzing wind monitoring data
- Using various Measure Predict Correlate (MCP) algorithms to perform corrections of on-site measured data based on correlation with long-term reference data from a nearby weather station.
- Projecting wind monitoring data to blade environment and other nearby locations
- Optimizing wind turbine site locations while taking into consideration wake losses
- Completion of turbine vendor site suitability forms
- Analyzing wind resources and power output potential for project financing
- Quantifying power output uncertainties
- Conducting Viewshed and Shadow Flicker analyses
- Preparing project visual renderings on landscape photos
- Assessing noise and other environmental impacts
- Certifying results and preparing expert reports

Enviroplan Consulting began offering meteorological analysis services for the wind energy industry in 2007 and has provided similar meteorological analysis services to the electric power industry, other industries and government agencies for over 30 years.

In the wind energy industry, Enviroplan Consulting has supplied meteorological monitoring equipment including lidar-based meteorological monitoring systems with proprietary portable power supplies and provided meteorological analysis and/or wind energy analysis services to wind energy companies for projects in the Midwest, Northeast and Mid-Atlantic regions as well as in Texas and Alaska.

Table 1 provides a summary of selected experience in meteorological monitoring. We have conducted operation and maintenance, quality assurance, data analysis and reporting and auditing of over 140 meteorological towers with 1,079 meteorological parameters for over 3,900 parameter-years. Currently, we are operating monitoring programs including 77 meteorological parameters in 13 monitoring networks.

We provide these services from our Operations Center and Quality Assurance Laboratories in Fairfield, New Jersey and Atlanta, Georgia and with our on-site monitoring personnel located at each monitoring network.

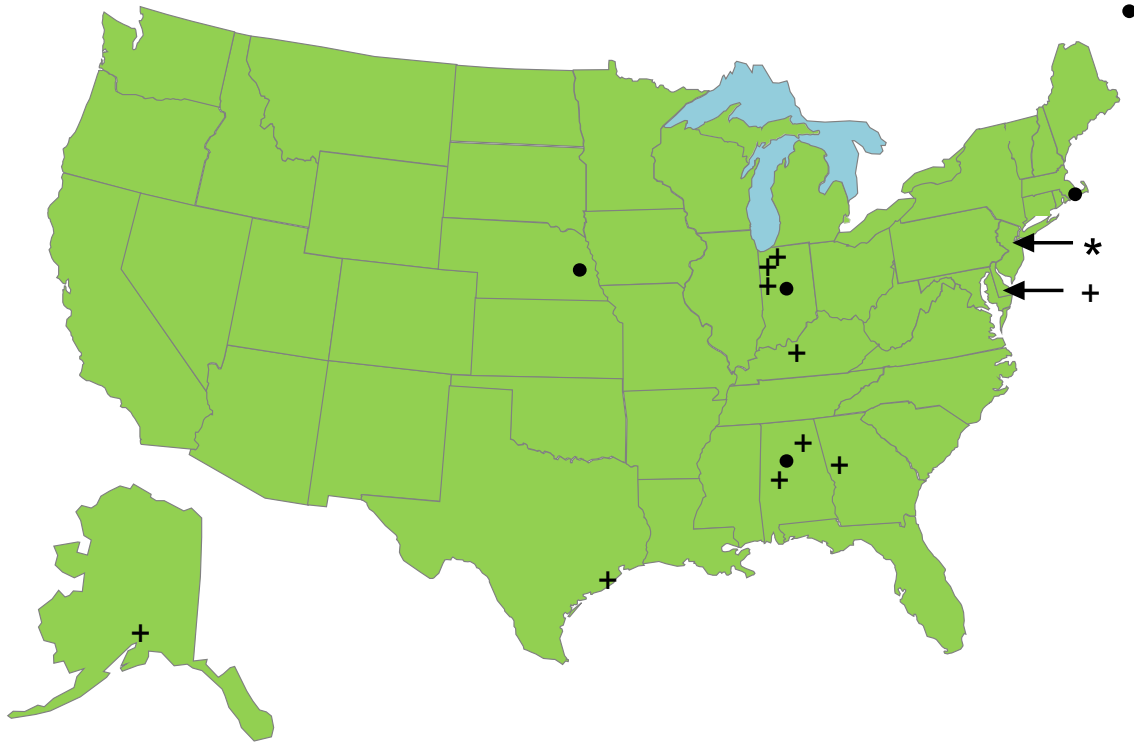
Highly trained monitoring technicians carry out meteorological and air quality sensor component and electronic instrumentation repair. Our field engineering resources, diagnostic instrumentation, and large spare parts and monitor inventory help assure reliable network operations.

A fully equipped quality assurance laboratory is maintained at our Fairfield, NJ headquarters. This laboratory provides the NIST-traceable calibration/certification standards for all meteorological parameters including anemometer drive motors, torque measuring devices, azimuth test fixtures, barometric pressure standards, and thermometer standards.

Our over 3,900 parameter-years of experience with meteorological monitoring include instrumentation from every major manufacturer as well as a wide range of state-of-the-art equipment.

The best evidence of the satisfaction of our clients with our meteorological monitoring services is the percent of valid data collection and the period of time our clients continue to use us for their monitoring needs. Every one of the over 140 meteorological towers and over 3,900 parameter-years of meteorological monitoring that Enviroplan Consulting has conducted has achieved or exceeded their valid quality assured data collection requirements and 97% of them continued using Enviroplan Consulting through completion of the contractor monitoring program even though these individual monitoring programs have operated for up to 16 years.

FIGURE 1: ENVIROPLAN CONSULTING HEADQUARTERS OFFICE, REGIONAL OFFICES, AND PROJECT OFFICES



Office	Location	Symbol
Headquarters Office	Fairfield, NJ	*
Midwest Regional Office	Indianapolis, IN	●
Southeast Regional Office	Birmingham, AL	●
Canadian Regional Office	Gander, Newfoundland	●
Project Offices	Anchorage, AK; Atlanta, GA; Fowler, IN; Dune Acres, IN; Wheatfield, IN; Delaware City, DE; Louisville, KY; Michigan City, IN; Tarrant, AL; Hueytown, AL; Brazoria, TX.	+
Wind Energy Client Management Services	Omaha, NE	●
Greenhouse Gas Verification Services	Hingham, MA	●

FIGURE 2: LOCATIONS OF STATES WHERE ENVIROPLAN CONSULTING HAS PROVIDED METEOROLOGICAL AND AIR QUALITY MONITORING SERVICES

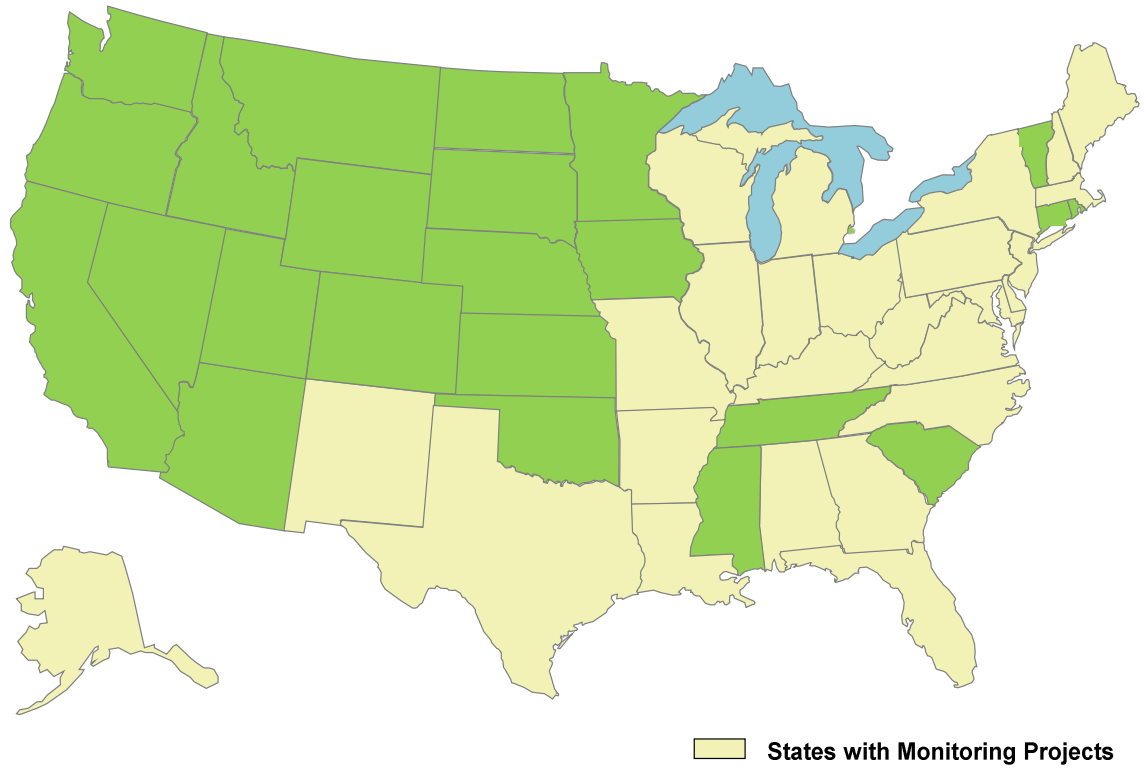


Table 1: Number of Meteorological Parameters Monitored and Period of Monitoring

Revision: 6/19/09				
			Total Number	Number of
Network Name	Period of		Meteorological	Meteorological
Currently Operated	Operation	Years	Parameters	Parameter-Years
ABC Coke	1998-Present	11	7	77
Alaska Wind Energy Project	2007-Present	2	4	4
Major Wind Energy Developer - Michigan	N/A	N/A	Develop and operate a portable power supply for a LIDAR	N/A
Major Wind Energy Developer - Pennsylvania	2008-Present	1	Develop and operate a portable power supply for a LIDAR	N/A
MeadWestvaco Corporation	1997-Present	12	11	132
Northern Indiana Public Service Co.	1991-Present	18	26	468
Oak Grove Resources, LLC: Concord Coal Preparation Plant (Initial State-up Phase)	N/A	N/A	10	10
Pollution Control Financing Authority of Warren County	2007-Present	2	6	12
Steel Dynamics Bar Products Division	2003-Present	6	4	24
Steel Dynamics Structural Mill Division	2001-Present	8	4	32
Texas Commission for Environmental Quality (TCEQ)	2008-Present	1	6	6
Valero Coke and Flux Handling Facility	2002-Present	7	0	0
Valero Oil Refinery	2000-Present	9	6	54
SubTotal			77	742
Other Networks Operated Since 1998				
Ohio Wind Energy Project	2008-2009	1	4	4
Warren County NJ Air Monitoring Project	2002-2006	4	10	40
University of Texas at Austin: TexAQS II Monitoring Project	2005-2007	2	41	82
Conectiv Energy	2002-2005	3	0	0
Caribbean Petroleum Refining	1999-2000	1	7	7
City of Toledo, Ohio	2001	1	0	0
Plantation Pipeline	2005-2007	2	4	8
Lions Copolymer	2005-2006	2	2	4
Steel Dynamics -Butler	1998-2001	3	4	12
SubTotal			72	157
Other Networks Operated Since 1992				
American Electric Power	1992-1995	3	8	24
BHP Minerals - Hartley	1992-1994	2	7	14
BHP Minerals - Mali	1992-1996	4	7	28
Caribbean Petroleum Corporation	1991-1996	5	7	35
Central Hudson Gas and Electric	1987-1998	11	17	187
Chambers Works Cogeneration Project	1993-1994	1	3	3
DuPont Chambers Works-Post Construction	1992-1993	1	4	4
Georgia Department of Natural Resources	1998-1999	1	0	0
Indianapolis Power and Light Company-Marion	1995-1996	1	3	3
Indianapolis Power and Light Company-Patriot	1991-1993	2	0	0
Indiantown Cogeneration Project	1994-1996	2	3	6
Keystone Cogeneration- Post Construction	1993-1994	1	0	0
Long Island Lighting Co. - Keyspan	1992	1	16	16
NARSTO Northeast	1995-1996	1	63	63
Pittsburgh Plate Glass-Circleville	1986-1994	8	7	56
Washington University Medical School	1993	1		0
Texas Air Control Board	1993	1	60	60
SubTotal			205	499

Table 1 (continued)

Network Name	Period of Operation	Years	Total Number Meteorological Parameters	Number of Meteorological Parameter-Years
Other Networks Operated Prior to 1992				
Allegheny Power Systems	1988	1	4	4
Allied Chemical	1980-1981	1	3	3
Arkansas Power and Light	1983-1984	1	5	5
Ashkelon Regional Assoc. of Towns for Env. Quality - Israel	1990	1	0	0
Baltimore Gas and Electric	1980-1981	1	0	0
Bath Iron Works	1990-1991	1	3	3
Breed Corporation	1985	1	0	0
Champion International	1987	1	7	7
Cincinnati Gas and Electric-Eastbend	1978-1985	7	0	0
Cincinnati Gas and Electric-Miami Ft/Beckjord	1975-1983	8	0	0
Cincinnati Gas and Electric-Zimmer	1984-1985	1	11	11
City Public Service Board of San Antonio	1981-1983	2	12	24
Cleveland Electric Illuminating-Avon Lake	1976-1989	13	21	273
Cleveland Electric Illuminating-Eastlake	1977-1982	5	24	120
Cleveland Electric Illuminating-Ashtabula	1976-1984	8	6	48
Cleveland Electric Illuminating-Lakeshore	1976-1984	8	0	0
Cleveland Electric Illuminating-Monitoring/Modeling Validation Study	1980-1981	1	18	18
Consolidated Edison	1979-1982	3	12	36
Consumers Power Company	1984	1	10	10
Cooperative Power	1981-1982	1	9	9
County of Westchester	1986	1	4	4
Dallas Independent School District	1981-1982	1	0	0
Dayton Power and Light	1982	1	4	4
DuPont Chambers Works-Pre Construction	1989-1990	1	4	4
Duquesne Light Company	1980-1984	4	8	32
Ferro Corporation	1987-1988	1	0	0
Ford Motor Company	1986	1	0	0
Foster Wheeler Power Systems, Inc.	1985-1986	1	0	0
SubTotal			165	615
Other Networks Operated Prior to 1992				
Freeport Sulfur Co./Duval Corp.	1985	1	4	4
Keystone Cogeneration- Pre Construction	1990-1991	1	0	0
Manner Textile Processing	1985	1	0	0
Marathon Oil	1980-1981	1	5	5
Massachusetts Port Authority	1985-1990	5	3	15
New England Power Company	1980-1983	3	12	36
New York State DOT	1974	1	4	4
Ohio Edison- Edgewater	1979-1982	3	20	60
Ohio Edison-Gorge	1979-1982	3	6	18
Ohio Edison-Niles	1982-1983	1	3	3
Ohio Edison Company-Burger/Sammis	1989-1991	2	10	20
Ohio Edison Company-Burger/Sammis	1978-1980	2	22	44
Ohio Edison/Penn Power Company-Mansfield/New Castle	1989-1991	2	22	44
Orange and Rockland Utilities - Bowline	1978-1983	5	20	100
Orange and Rockland Utilities - Lovett	1986-1991	5	0	0
Pennsylvania Power Company-Mansfield/New Castle	1982-1983	1	14	14
Pittsburgh Plate Glass-Barberton	1980-1982	2	2	4
Plaza Humaco Mall	1990	1	4	4
Public Service of New Hampshire	1980-1983	3	8	24
Public Service of New Mexico	1984	1	16	16
Public Service of Indiana	1983-1985	2	20	40
Public Service of Indiana	1981-1982	1	0	0
Taiwan Power Company	1988	1	0	0
Union Electric Company	1986	1	8	8
United Engineers and Constructors	1989-1990	1	11	11
Wisconsin Power and Light Company-Edgewater/Lakeshore	1976-1991	15	16	240
SubTotal			560	1,944
TOTALS			1,079	3,957

SECTION 2: CAPABILITIES OF KEY PERSONNEL

Following are descriptions of Enviroplan Consulting key personnel in our meteorological consulting and monitoring businesses for the wind energy industry. Table 2 presents a summary of the capabilities and experience of our principal professional staff. Appendix A presents the resumes of key professional staff involved in our wind energy and meteorological consulting and monitoring programs.

Howard M. Ellis, D.B.A., QEP, President

Environmental Studies Division

Allen C. Dittenhoefer, Ph.D., Senior Vice President

Michael F. Hirtler, CCM, Vice President

Ronald D. Baldwin

John Bewick, D.B.A.

Edd Frazier, P.E.

Boyd Hurst, P.E.

James Mahoney, Ph.D.

Linda M. Quigley

Julia Shannon, E.I.T.

Daniel V. Steen, P.E.

Ganesh Srinivasan

Tanya White

Monitoring Division

David Cummings, Vice President

Thomas Ferrebee, Quality Assurance Manager

Kathleen M. Stanwood, Data Analysis and Reporting Manager

David Arbanes

Wayne Biro

Brian E. Hambrick

Josh Miller

Renee Simms

Justin Stinson

Kevin Ruggiero

Thomas W. Surfus

Enviroplan Consulting's 37 years of experience with meteorological consulting and monitoring programs has made clear that the most important key to success in achieving the client's objectives is to have the best staff conducting meteorological consulting studies and directing and operating the meteorological monitoring program, where best is measured by the knowledge, experience, track record of performance, training and education of each staff member as indicated in Table 2.

Name	Position	Years Exp.	Education	States with Experience	Areas of Expertise	Registrations and Licenses	Office Location
Dave Cummings	Vice President and Project Manager	23	Associates of Applied Science, Electronics	AL, DE, FL, GA, IL, IN, MA, ME, NH, NJ, NY, OH, PA, PR, TX, VA, WI, WV	Management of meteorological monitoring operations, preparation of Quality Control Plans for monitoring and auditing of monitoring operations.		Fairfield, NJ
Allen Dittenhoefer	Senior Vice President and Project Manager	28	B.S., M.S. and Ph.D. Meteorology	AL, CA, CO, DE, FL, GA, IL, IN, IA, KY, LA, MD, MA, MI, MO, NJ, NY, NC, OH, PA, SC, TN, TX, VA, WV, WI	Reviewer of wind resource assessments. Meteorological modeling. Atmospheric chemistry, aerosol physics, and atmospheric visibility assessments.		Birmingham, AL
Howard Ellis	President and Project Manager	36	B.S. Electrical Engineering, M.B.A., D.B.A., Post Graduate Courses Meteorology	MA, NY, NJ, DE, MD, VA, PA, WV, OH, IN, MI, IL, KY, TN, TX, CO, FL, GA, MO, WI	Meteorological analyses of wind fields. Senior reviewer for wind resource feasibility studies. Other meteorological modeling.	Qualified Environmental Professional	Fairfield, NJ
Michael Hirtler	Vice President and Project Manager	24	B.S. Meteorology, Graduate Courses Atmospheric Science	NJ, NY, PA, OH, DE, IN, IL, WV, AL	New source review including PSD permitting, air quality modeling, long range transport modeling in PSD Class I areas, fugitive emissions impact analyses, complex terrain modeling, hazardous air pollutant modeling Title V and state air permitting	Certified Consulting Meteorologist	Fairfield, NJ
David Arbanes	Monitoring Technician	2	Certificate-Electronics Technology	IN	Operation and maintenance of meteorological monitoring networks.		Wheatfield, IN
Ron Baldwin	Business Development Director, Wind	12	B.A.S. Nuclear Technology A.A.S. Radiation Protection Technology	Throughout the U.S.	Business development of wind operations and development		Council Bluffs, IA
John Bewick	Senior Engineer	36	B.S. Engineering Physics, M.S. Nuclear Science, M.B.A., D.B.A	Throughout the U.S.	Development of environmental management processes and systems, environmental assessments and audits, greenhouse gas emissions inventory development. Review of meteorological data and meteorological modeling.		Hingham, MA
Wayne Biro	Monitoring Engineer	3	Certifications, U.S. Navy Electronics Schools	DE	Operation and maintenance of meteorological monitoring networks.		Bear, DE
Thomas Ferreebe	Manager	13	B.S. Electronic Engineering Technology	GA, IN, VA, NY, DE, OH, AL	Manages meteorological monitoring operations, performs auditing of monitoring operations, and training in operation of monitoring instrumentation.		Fairfield, NJ

Table 2 (continued)

Name	Position	Years Exp.	Education	States with Experience	Areas of Expertise	Registrations and Licenses	Office Location
Edd Frazier	Manager	31	M.S. Mechanical Engineering B.S. Mechanical Engineering	KY	Air quality permit application review for completeness and technical accuracy, emissions estimation, regulatory reviews and compliance assessments, BACT analyses, NSPS, NESHAP and Title V permit preparation. Management of above permitting activities.	Professional Engineer	Louisville, KY
Brian Hambrick	Monitoring Technician	7	B.S.	VA, IN	Meteorological monitoring operation and maintenance and quality control.		Covington, VA
Boyd Hurst	Manager	28	M.S. Mechanical Engineering B.S. Mechanical Engineering	Throughout the U.S.	Meteorological data review for meteorological modeling to satisfy government regulatory requirements. Emissions estimation, applicability determinations and control technology evaluations for air pollution permits at 29 Exxon /Mobil oil refineries and chemical plants.	Professional Engineer	Louisville, KY
Kenneth Jaffe	Senior Wind Energy Manager	>25	M.S. Atmospheric Sciences B.S. Atmospheric Sciences	Throughout the U.S.	Senior wind energy manager with >25 years of professional experience. Expertise in wind analysis, energy assessment, project and team management, weather forecasting, wind farm design, operational testing/evaluation, meteorological monitoring, and business development.		Austin, TX
James Mahoney	Senior Scientist	40	B.S. Physics Meteorology Ph.D.	Throughout the U.S.	Advanced meteorological modeling. Global climate change; acid precipitation, insurance recovery for environmental damages; technical analyses of regional air quality and haze patterns, environmental compliance, planning and engineering. Former Deputy Administrator of the National Oceanic and Atmospheric Administration.		Ashburn, VA
Linda Quigley	Staff Scientist	13	B.A. Geography and Environmental Studies	IN	Data analysis and reporting and quality assurance for meteorological and air quality monitoring networks.		Fairfield, NJ

Table 2 (continued)

Name	Position	Years Exp.	Education	States with Experience	Areas of Expertise	Registrations and Licenses	Office Location
Kevin Ruggiero	Monitoring Engineer	1	B.S. Business Management	NJ, PA, OH, IN, DE, VA, AL, TX	monitoring networks. Meteorological data review and quality control. Auditing of meteorological monitoring networks.		Fairfield, NJ
Julia Shannon	Engineer	3	B.S. Chemical Engineering	IN, AK	Meteorological modeling. Meteorological data review. Air quality permit preparation.	Engineer in Training	Fairfield, NJ
Renee Simms	Monitoring Technician	2	B.S. Microbiology	LA	Meteorological monitoring operation and maintenance and quality control.		Baton Rouge, LA
Ganesh Srinivasan	Engineer	5	M.S. Civil & Environmental Engineering B.E. Instrumentation and Control	FL, OH, IN, IL	Meteorological modeling using MM5 regional meteorological data. Regional air pollution modeling using the CAMX numerical model for modeling 8-hour ozone and 24-hour and annual PM2.5 concentrations.		Indianapolis, IN
Kathy Stanwood	Manager	29	B.S. Biology, M.A. Environmental Studies	AL, DE, FL, GA, IN, MA, ME, MI, NH, NJ, NY, OH, PA, PR, RI, TX, VA, WI, WV	All phases of wind data analyses and reporting in support of meteorological monitoring.		Fairfield, NJ
Daniel Steen	Senior Principal	43	B.S. Electrical Engineering Juris Doctorate	Throughout the U.S.	Mr. Steen is a Senior Principal at Enviroplan Consulting where his primary focus is consultation on planning and design of compliance options for GHG emission limitations. Following his retirement in 2009 as V.P., Environmental of FirstEnergy Corporation, one of the largest electric utilities in the United States, he joined Enviroplan Consulting on a part time basis. He is former Chair of the Global Climate Change Subcommittee of the Edison Electric Institute and a member of the Pennsylvania Alternative Energy Advisory Council that helped establish the recommended requirements for alternative energy for electric utilities. Mr. Steen has extensive experience negotiating power purchase agreements between electric utilities and wind developers.	Professional Engineer; Licensed Attorney	Ohio

Table 2 (continued)

Name	Position	Years Exp.	Education	States with Experience	Areas of Expertise	Registrations and Licenses	Office Location
Justin Stinson	Monitoring Technician	1	A.A.S. Electronics Engineering	IN	Meteorological monitoring operation and maintenance and quality control.		Columbia City, IN
Tom Surfus	Monitoring Engineer	25	A.A.S. Electronics Engineering	MA, NY, NJ, DE, MD, VA, PA, OH, IN, MI, IL, KY, TN, CO, FL, GA, MO, WI	Meteorological monitoring operation and maintenance and quality control.		Avon, IN
Tanya White	Wind Resource Analyst/Scientist	4	B.S. Environmental Science and Physical Geography	AK, NY, TX, IN	Certified in WindPRO®. Certified in MAPINFO Geographical Information Systems (GIS). Performs wind resource assessments, wind project feasibility studies, noise, flicker, and shadow analyses, wind farm photo renderings, and data analysis, radar interference assessments and other analyses for wind energy projects.		Fairfield, NJ

APPENDIX A: RESUMES OF KEY ENVIROPLAN CONSULTING PROFESSIONAL STAFF PROVIDING METEOROLOGICAL CONSULTING SERVICES AND MONITORING PROGRAMS TO THE WIND ENERGY INDUSTRY

David Cummings

Dr. Al Dittenhoefer

Dr. Howard Ellis

Ronald Baldwin

Thomas Ferrebee

Michael Hirtler

Dr. James Mahoney

Kevin Ruggiero

Ganesh Srinivasan

Kathleen Stanwood

Daniel Steen

Tanya White

DAVID S. CUMMINGS

AREAS OF SPECIALIZATION

Vice President and Director, Air Quality Monitoring Division. Responsible for overall management of ambient monitoring operations. Experienced in project management, quality assurance, ambient air quality and meteorological monitoring (all facets).

PROJECT EXPERIENCE

Project Manager responsible for network and station design, installation and monitoring program oversight for complete operation, maintenance, quality assurance, data reduction, validation, reporting, and administration for over thirty different clients and projects. Selected examples follow:

NARSTO: Auditor of NARSTO air quality and meteorological monitoring sites throughout the Northeast. Performance and systems of all air quality monitors operated by NARSTO in the Northeast.

State of Georgia: Technical advisor for contract with State of Georgia Department of Natural Resources Air Protection Branch to operate the majority of the state's air quality monitoring program including 19 continuous monitors for ozone, NO_x, SO₂, and CO; 19 PM₁₀ monitors; 29 PM_{2.5} monitors; and about 60 air toxics samplers for metals, PUF, VOC, lead and carbonyl. Directly responsible for the redesign of QC checklists, sample data sheets and other documentation for the monitoring program. Assisted in preparing the PM_{2.5} monitoring program Standard Operating Procedures and beginning and operating the PM_{2.5} monitoring program for nine months. Work involved full operation and maintenance, data analysis and reporting as well as quality control activities and performance audits.

City of Toledo: Supervised performance and systems audits of their four PM_{2.5} samplers, repaired malfunctioning samplers and conducted training program in proper operation and quality control.

American Electric Power Corp.: Five-station PSD monitoring network, including four SO₂ stations and a 60-meter, multi-level instrumented meteorological tower, operating in support of an Indiana-Kentucky Electric Power Generating Station.

BHP Minerals: Two meteorological monitoring stations, one in Mali, Africa, another located in Zimbabwe, Africa, operated in support of mining and processing facilities at these locations. Parameters monitored supported modeling studies conducted by Enviroplan Consulting to show compliance with World Bank ambient air quality standards for proposed expansion of these facilities. Parameters include SO₂, wind speed, wind direction, sigma theta, air temperature, net radiation, relative humidity, evaporation, and precipitation.

Bechtel Corporation: A total of five multi-station networks operated in support of PSD permitting requirements for three cogeneration power plants, two of which are located in southern New Jersey and one in Florida. These networks provided both pre- and post-construction air quality study data. Responsibilities included siting assistance and approvals, design, supply and installation of the monitoring stations, and complete program operation and management. Parameters include SO₂, NO-NO_x, PM10, and meteorological monitoring.

Caribbean Petroleum Corporation: Four-station monitoring network, including three SO₂ and one meteorological site operated in support of EPA permitting requirements for a petroleum refinery located in Bayamon, Puerto Rico. Designed and installed real-time alarms to transmit high ambient SO₂ conditions via telemetry to refinery control center for corrective action and process control.

Bath Iron Works: A single-station PSD monitoring network operated in support of operating permit renewals for this shipyard in Bath, Maine. Assisted in station siting and approval by Maine Department of Environmental Protection, in addition to installation, operation, maintenance, and data reporting. Parameters included SO₂, PM10, and meteorological monitoring.

Indianapolis Power and Light: Sited, installed and operated three PSD monitoring networks in support of permit applications for construction of a new fossil-fueled power generation plant to be located in Patriot, Indiana, and expansion of existing capacity at power generating stations in Pritchard and Indianapolis, Indiana. Parameters monitored include SO₂, NO-NO_x, CO, O₃, and PM10.

United Engineers and Constructors: A pre-construction PSD monitoring network, which provided ambient data in support of planned construction of a new fossil-fueled generating plant near Sutherland, Virginia. Parameters monitored include SO₂, NO-NO_x, O₃, PM10, TSP, heavy metals, and meteorological data from a 100-meter multi-level instrumented tower, including wind speed, wind direction, sigma theta, air temperature and temperature difference, dew point, and precipitation.

E.I. DuPont de Nemours: A four-station multi-year monitoring network installed and operated in support of permitting for construction of a rotary kiln waste incinerator and secure landfill for this large chemical facility in southern New Jersey. Parameters include SO₂, NO-NO_x, PM10, TSP, meteorological data, and a multi-media program for air toxics monitoring, including metals, organic matter, VOCs, SVOCs, mercury vapor, dioxins and furans.

The following selected projects are representative of experience managing monitoring programs which include operation, maintenance, quality assurance, data reduction and reporting (no installation):

Central Hudson Gas and Electric: A seven-station PSD network monitoring SO₂, NO-NO_x, PM10, TSP, and meteorological parameters in support of two fossil and gas-fueled power generating plants located in Newburgh, New York.

Pennsylvania Power and Ohio Edison: Four PSD monitoring networks comprised of thirteen separate monitoring stations operated in support of four power generating stations located along the Ohio River in Pennsylvania, West Virginia, and Ohio. Parameters include SO₂, PM10, and multiple meteorological sites.

Orange and Rockland Utilities: A thirteen-station PSD monitoring network operated in support of the coal conversion project for the Lovett generating station in Tomkins Cove, New York. Parameters include twelve SO₂ and five meteorological sites. Unique features of this program included challenging operation and maintenance logistics owing to the sites' location in a state park classified as a primitive area, with access improvements prohibited by law, and real-time data telemetry requirements for all sites to the New York State Department of Environmental Conservation. A special study for air toxics and particulates was also conducted as part of this program.

Cleveland Electric Illuminating: A twenty-station, multiple-network PSD monitoring program operated in support of two fossil-fueled power generating stations. Parameters include SO₂ and multiple meteorological stations incorporating instrumented towers ranging from 10 to 100 meters.

Wisconsin Power and Light: From five to twelve stations operated at various times during this PSD monitoring program in support of a fossil-fueled power generating station located in Sheboygan. Parameters included SO₂, NO-NO_x, O₃, non-methane hydrocarbons, TSP, multiple tall-tower meteorological sites, and acoustic radar to profile atmospheric temperature and stability characteristics.

Northern Indiana Public Service Company: A three-network, eight-station PSD monitoring program in support of three coal-fired power generating plants in northern Indiana. Parameters include SO₂, PM10, and multiple meteorological sites with towers ranging from 10 to 100 meters.

The Turbitrol Company: Designed and installed an ambient monitoring station in support of expansion of a New York City sewage treatment facility located in Coney Island. Parameters included SO₂, H₂S, CO, O₃, NO-NO_x, and six meteorological parameters. The station incorporated real time remote data transmission and calibration status signals. Enviroplan Consulting provided a complete operation and maintenance training program for sewage plant personnel as well.

GENERAL

Mr. Cummings has directed project teams conducting environmental programs ranging in size from \$60,000 to \$2,000,000 for numerous companies in the electric utility, manufacturing, chemical, petrochemical, waste-to-energy, general industry, and public sectors.

EDUCATION

Associates of Applied Science in Electronics, University of Hartford, CT

Bachelors of Engineering Technology, University of Hartford, CT

U.S. EPA: Courses completed in a variety of air pollution topics

ALLEN C. DITTENHOEFER, Ph.D.

AREAS OF SPECIALIZATION

Senior Vice President of the Environmental Studies Division. Dr. Dittenhoefer has 30 years of experience as an environmental consultant in areas including estimation of toxic air emissions and other chemical releases from complex mobile and stationary sources, atmospheric dispersion modeling, long range transport, atmospheric chemistry, aerosol physics, atmospheric visibility and multimedia environmental audits. His responsibilities include principal investigator, project management and senior review, administration of company research programs and coordination of new technical developments, regulatory negotiations, and other air pollution consulting services.

PROJECT EXPERIENCE

Dr. Dittenhoefer has managed projects relating to estimating and measuring emissions from complex source groups such as coke batteries, storage tanks, equipment components and surface impoundments; complex area and volume sources; air pollution control systems; licensing of cogeneration facilities, including multi-disciplinary impact assessments; plume transport and diffusion in hilly terrain and in lakeshore environments; dispersion model development and evaluation; ozone chemistry and transport; long range and mesoscale transport; air quality and precipitation chemistry trends; plume sulfur chemistry; and coal sulfur variability. Selected project experience includes:

Steel Company: Development of risk management plan to satisfy requirements of Section 112(r) of 1990 Clean Air Act Amendments. Work included hazard assessment and development of an emergency response plan and prevention program.

Coke Industry: Review, development and application of improved/refined emissions estimation methodologies for the coke industry, including work for the American Coke and Coal Chemicals Institute and various member companies. Preparation of comments and recommendations to U.S. EPA on AP-42 emission factors for the coke industry.

Title V Permitting: Project Manager/Senior Reviewer for numerous Title V projects for the iron/steel/coke, natural gas transmission, cogeneration, and metals processing industries. Work includes permitting strategy development, interface with regulatory agencies, comprehensive emission inventory development, regulatory applicability and compliance assessment, evaluation of alternative operating scenarios, and development of monitoring/recordkeeping protocols. Clients include Bethlehem Steel, Consolidated Natural Gas Transmission, Acme Steel, Gulf States Steel, Koppers Industries, Sloss Industries, Shenango, Laclede Steel, and ABC Coke.

Major Steel Company: Project Manager of study to assess environmental impact of alternative opacity limits for coke oven underfire stacks. Work included a plume view-shed analysis using an atmospheric visibility model, a community health impact analysis, and coordination of activities related to aesthetic and land use impacts of increased plume opacities.

Selected Industrial Companies: Project Manager/Principal Investigator on numerous studies involving emissions inventory development and air quality modeling of multi-source regions including steel, chemical, and other industrial manufacturing complexes. Work included SARA Title III Sections 312 and 313 reporting.

Several Industrial Companies: Project Manager on numerous projects to conduct equipment leak testing of equipment components, analyze the resulting data, and develop emission rates from these source categories.

Major Electric Utility: Project Manager/Principal Investigator of a study to determine and document the operating experience of electrical power generation facilities that use Selective Catalytic Reduction (SCR) for the control of NO_x emissions from gas turbines. The study involved a literature review of SCR technology and site visits to three cogeneration facilities which utilize SCR.

Chemical Manufacturers Association (CMA): Project Manager to coordinate a CMA fugitive emissions study for ethylene oxide and butadiene production facilities. The study involved review and development of a mass emissions sampling protocol for fugitive emissions from equipment components, organization of a workshop for U.S. EPA and CMA-member companies to discuss the sampling protocol and QA/QC procedures, overseeing the collection of sampling data at 17 facilities, and data analysis and reporting.

Several Electric Power Companies: Project Manager on numerous projects involving the permitting of simple cycle and combined cycle gas turbines. Work involved PSD air quality modeling and BACT analyses, preparation of air pollutant and cooling water discharge permit application forms, on-site sound-level analyses, and analysis of proposed facility impacts on land, water, agriculture, public health, energy, transportation, historic and archaeological resources, plants and animals, aesthetic resources, etc. Work also included participation in public hearings.

Truck Stops of America: Project Manager to review existing air quality and to assess the air quality impact of a proposed expansion of a truck stop along Interstate Route 80, in Knowlton Township, NJ. The project involved application of U.S. EPA emission factors for moving and idling vehicles and appropriate air quality dispersion models. Dr. Dittenhoefer provided expert testimony on the results of the investigation.

Freeport McMoRan, Inc.: Project Manager to measure and model the particulate and gaseous (i.e., SO₂, H₂S, and VOC) emissions from multi-vent liquid sulfur storage tanks. The study involved development of a test method for particulate emissions and a technique to measure wind-induced ventilation of these tanks, as well as air quality modeling of tank emissions.

Several Electric Utilities: Project Manager for studies of coal sulfur variability and of the impact on SO₂ NAAQS attainment of alternative SO₂ emission limit compliance methods. These studies involved the simulation of short-term SO₂ emission rate variability through use of a first-order autoregressive model applied to the distributional and time series properties of observed longer-term coal sulfur data.

Ohio Edison Company: Project Manager to analyze data collected from an airborne plume tracer field study conducted downwind of the Sammis Power Plant. The objectives of the study were to compare observed plume rise to that predicted using standard formulas, to determine an empirical relationship between rising terrain and elevation of plume centerline above ground level, and to quantify the effects of hilly terrain on plume dispersion for input into a site-specific dispersion model.

Cleveland Electric Illuminating Company: Project Manager to analyze ground- and aircraft-based monitoring data collected from a field study of plume dispersion at the Avon Lake Plant. Study objectives were to study plume dispersion under conditions of lake-effect fumigation and to develop and evaluate a site-specific fumigation dispersion model for the plant.

Allegheny Power Service Corporation: Project Manager to evaluate air quality dispersion models for use at the Albright Power Station. The project involved the evaluation of five complex terrain dispersion models using on-site and airport meteorological data, continuous emission monitoring data, and SO₂ monitoring data.

Firestone Tire & Rubber Company: Principal Investigator to analyze meteorological conditions during high measured ozone concentrations in the California North Central Coast Air Basin and to assess the influence of regional-scale transport on these ozone episodes.

Ohio Edison Company: Project Manager to develop and evaluate a receptor-oriented regional-scale simulation model. Study objectives were to 1) develop a long range transport model to simulate the transport, chemical transformation, and deposition of acid precursors and 2) evaluate this model against measured precipitation sulfate concentrations at the MAP3S site at Whiteface Mountain, NY. An analysis of Lagrangian precipitation statistics was also conducted.

National Research Council/National Oceanic and Atmospheric Administration: National Research Council Post-Doctoral research Associate at the Mauna Loa Observatory, Hawaii. The purpose of this research assignment was to monitor global baseline concentrations of atmospheric sulfate particles, quantify their impact on light scattering and precipitation chemistry, and investigate the long range transport of soil dust and anthropogenic sulfur particles from Eastern Asia to Hawaii.

New Jersey Department of Environmental Protection: Project Manager of a study to estimate the air quality and atmospheric acid deposition impact throughout southern New Jersey of a major coal-burning power plant. The study involved the application of the Enviroplan Climatological Dispersion and Deposition Model, developed by Dr. Dittenhoefer for evaluating worst-case mesoscale acid deposition impacts of point or area sources.

Ohio Electric Utility Institute: Project Manager to analyze recent sulfur wet deposition and SO₂ emissions trends in Eastern North America. The objectives of this study were to 1) investigate the relative importance of meteorological versus SO₂ emissions with respect to precipitation sulfate concentrations, 2) examine the relative importance of local versus distant SO₂ source regions on sulfate concentrations, and 3) estimate the degree of linearity between regional SO₂ emissions and sulfate wet deposition in the northeastern U.S.

The Pennsylvania State University/U.S. Department of Energy: Ph.D. Dissertation. The objectives of this research were to measure the chemical transformation of SO₂ to sulfate in a coal-fired power plant plume and to estimate the relative importance of various gaseous/aqueous phase chemical mechanisms for plume sulfate formation. The study involved sampling of the Keystone Power Plant plume in western Pennsylvania using instrumented aircraft and featured use of an innovative technique to quantitatively detect sulfate in individual particles with an electron microscope.

PUBLICATIONS

Dittenhoefer, A.C., Ellis, H.M., Yousuf, A.A., Hydari, N.H., Bent, A. and Roy, S. (2003) "Projected Attainment Status of Each County in the U.S. with the PM_{2.5} National Ambient Air Quality Standards Based on 1999-2001 Monitoring Data and Strategies for Dealing with Nonattainment Designations". Presented at the Air & Waste Management Association 96th Annual Meeting, San Diego, CA, June 22-26, 2003.

Ellis, H.M., Hirtler, M.F., and Dittenhoefer, A.C. (2002) "New Developments Impacting Air Pollution Construction Permitting for New Combustion Turbines", EM Magazine, July 2002.

Ellis, H.M., Hirtler, M.F., and Dittenhoefer, A.C. (2001) "Impact of New Regulatory and Technological Developments on Obtaining Air Pollution Construction Permits for New Combustion Turbines for Electric Power Generation and Strategies for Dealing with These Developments". Presented at the Air & Waste Management Association 94th Annual Meeting, Orlando, FL, June 24-28, 2001.

Dittenhoefer, A.C. (1998) "MACT Residual Risk Issues Facing the Metals Industry". Presented at the Air & Waste Management Association Specialty Conference on Environmental Innovations in the Metals Industry for the 21st Century, Pittsburgh, PA, March 1998.

Dittenhoefer, A.C., Fleck, C.M., Hirtler, M.F., and Pan, S.C. (1997) "Hazard Assessment Modeling Under Clean Air Act Section 112(r) at Iron and Steel Facilities." Presented at the Air & Waste Management Association 90th Annual Meeting, Toronto, Canada, June 8-13, 1997.

Dittenhoefer, A.C. and Menne, M.L., (1992) "Evaluation of the U.S. EPA SRDT and Net Radiation Based Stability Classification Systems." Air & Waste Management Association 85th Annual Meeting, Kansas City, MO, June 21 26, 1992.

Dittenhoefer, A.C., Ellis, H.M., Romano, R.R., and Arnold, S. (1992) "Correlation Equations and Default Zero Emission Rates for Equipment Components: Comparison of Results from U.S. EPA's SOCOMI Study and a New Study of 17 Chemical Plants." Air & Waste Management Association Specialty Conference, King of Prussia, PA, April 21 24, 1992.

Dittenhoefer, A.C., Simpson, E.B., and Romano, R.R. (1991) "Status Report on the Chemical Manufacturers Association/U.S. EPA Fugitive Emissions Bagging Study for Ethylene Oxide and Butadiene Production Facilities." Air & Waste Management Association Specialty Conference on SARA Title III Section 313, New Orleans, LA, March 12 14, 1991.

Dittenhoefer, A.C. and Fridley, W.I., (1991) "Industry Guide for Improving the Accuracy of SARA Title III Section 313 Release Estimates." Air & Waste Management Association Specialty Conference on SARA Title III, Section 313, New Orleans, LA, March 12 14, 1991.

Dittenhoefer, A.C. and Fridley, W.I., (1989) "Toxic Emissions from the Coke, Iron, and Steel Industries: A Guide to SARA Title III Reporting." Air & Waste Management Association 82nd Annual Meeting, Anaheim, CA, June 25 30, 1989.

Dittenhoefer, A.C., Fridley, W.I., and Holcombe, R.S. (1989) "SARA Title III, Section 313 R Form Preparation for Gulf States Steel, Inc." Air & Waste Management Association Specialty Conference on SARA Title III, Section 313 Industry Experience in Estimating Chemical Releases, King of Prussia, PA, April 3 6, 1989.

Berglund, R.L.; Dittenhoefer, A.C.; Ellis, H.M.; Watts, B.J.; and Hansen, J.L. (1987) "Evaluation of the Stringency of Alternative Forms of a National Ambient Air Quality Standard for Ozone." APCA International Specialty Conference on The Scientific and Technical Issues Facing Post 1987 Ozone Control Strategies, Hartford, Connecticut, November 16 19, 1987.

Dittenhoefer, A.C. and Solinski, P.J. (1987) "On the Use of Elemental Tracers for Regional Sulfate Source Apportionment." 80th Annual Meeting of the Air Pollution Control Association, New York, New York, June 21 26, 1987.

Dittenhoefer, A.C. and Ferullo, A.F. (1985) "Analysis of Recent Sulfur Wet Deposition and SO₂ Emissions Trends in Eastern North America." 78th Annual Meeting of the Air Pollution Control Association, Detroit, Michigan, June 16 21, 1985.

Dittenhoefer, A.C. and Ferullo, A.F. (1985) "A Comparison of Predicted and Measured Sulfate Concentrations for Precipitation Events at Whiteface Mountain." 78th Annual Meeting of the Air Pollution Control Association, Detroit, Michigan, June 16 21, 1985.

Dittenhoefer, A.C. and Ferullo, A.F. (1984) "A Comparison of Lagrangian Precipitation Statistics Computed with Two Regional Scale Atmospheric Transport Models." 77th Annual Meeting of the Air Pollution Control Association, San Francisco, California, June 24 29, 1984.

Dittenhoefer, A.C. (1984) "Evidence of Aqueous Phase SO₂ Oxidation in Power Plant Plumes." 77th Annual Meeting of the Air Pollution Control Association, San Francisco, California, June 24 29, 1984.

Dittenhoefer, A.C. (1983) "Critical Review of the National Research Council Report on Acid Deposition", Enviroplan Report No. 1141 285, prepared for the Ohio Electric Utility Institute.

Dittenhoefer, A.C. and Ferullo, A.F. (1983) "A Dual Mode Regional Air Back Trajectory Model," Air Pollution Control Association Specialty Conference on The Meteorology of Acidic Deposition, Hartford, Connecticut, October 16 19, 1983.

Dittenhoefer, A.C. (1983) "Measurements of Power Plant Plume Dispersion in Hilly Terrain." 76th Annual Meeting, of the Air Pollution Control Association, Atlanta, Georgia, June 19-24, 1983.

Dittenhoefer, A.C. (1982) "The Effects of Sulfate and Non Sulfate Particles on Light Scattering at the Mauna Loa Observatory", Water, Air and Soil Pollution 18, 105-121.

Dittenhoefer, A.C. (1982) "The Effects of Sulfate Particles on the Precipitation Chemistry of Hawaii," Second Symposium on the Composition of the Nonurban Troposphere, Williamsburg, Virginia, May 25 28, 1982.

Dittenhoefer, A.C. (1982) "The Effects of Sulfate and Non Sulfate Particles on Light Scattering at the Mauna Loa Observatory," in Long Range Transport of Airborne Pollutants, D. Reidel Publishing Company, Dordrecht, Holland.

Dittenhoefer, A.C. (1982) "A Critical Review of Long Range Transport/ Acid Precipitation Models." 75th Annual Meeting of the Air Pollution Control Association, New Orleans, Louisiana, June 20-25, 1982.

Dittenhoefer, A.C. (1981) "The Long Range Transport of Atmospheric Sulfate Observed at the Mauna Loa Observatory," AMS/CMOS Conference on Long Range Transport of Airborne Pollutants, Albany, New York, April 27-30, 1981.

Dittenhoefer, A.C. and de Pena, R.G. (1980) "Sulfate Aerosol Production and Growth in Coal Operated Power Plant Plumes," Journal of Geophysical Research 85, 4499-4506.

Dittenhoefer, A.C. and de Pena, R.G. (1979) "The Conversion of SO₂ to Sulfate Particles in Coal Fired Power Plant Plumes," Fourth Symposium on Turbulence, Diffusion, and Air Pollution, Reno, Nevada, January 15-18, 1979.

Dittenhoefer, A.C. and de Pena, R.G. (1978) "A Study of Production and Growth of Sulfate Particles in Plumes from a Coal Fired Power Plant," Atmospheric Environment 12, 297-306.

Dittenhoefer, A.C. and Dethier, B.E. (1976) "The Precipitation Chemistry of Western New York: A Meteorological Interpretation," Office of Water Research and Technology, U.S. Dept. of Interior, Washington, D.C., 45 p.

EDUCATION

Ph.D., Meteorology, The Pennsylvania State University

M.S., Meteorology, Cornell University

B.S., Meteorology, Cornell University

AFFILIATIONS

Air & Waste Management Association

AB 3 Meteorology Committee

EI 6 Iron and Steel Committee

ITF 2.1 Sources and Emission Characterization Committee

American Meteorological Society

Phi Kappa Phi

Chi Epsilon Pi

Sigma Xi

HOWARD M. ELLIS, D.B.A., QEP

AREAS OF SPECIALIZATION

President of Enviroplan Consulting. Senior consultant with 37 years experience including experience in wind resource assessments and meteorological monitoring programs for wind developers and the electric power industry. Other experience includes air pollution emissions inventory development on local and regional scales, development and application of atmospheric diffusion models, air pollution permitting, air quality and meteorological monitoring; and development of risk management plans and environmental management systems. Current focus also includes Greenhouse Gas (GHG) emissions inventory development and the validation and verification process for GHG assertions.

EXPERIENCE

Project Manager and Technical Reviewer of several wind resource assessments for wind developers and the electric power industry including wind resource prospecting and full wind resource analyses.

Project Manager and Principal Investigator for the American National Standards Institute on a project to develop an ANSI accreditation program for validation and verification bodies for GHG assertions in accord with ISO 14065.

Senior Reviewer of various projects to develop GHG emissions inventories and mitigation measures.

Project manager and Co-Principal Investigator on numerous projects for development of State Implementation Plan revisions for demonstrating attainment of the National Ambient Air Quality Standards for ozone and PM_{2.5} and Reasonable Progress Goals for Regional Haze in PSD Class I Areas including projects in the Chicago-Milwaukee-Racine, Cleveland and Birmingham AL Nonattainment Areas.

Project manager and principal investigator on numerous Prevention of Significant Deterioration studies to obtain construction permits for new simple cycle and combined cycle combustion turbines and coal-fired power plants. Work involved directing and conducting project planning assistance to identify potential pitfalls associated with the project; development of emission inventories and emissions netting analyses to determine applicability for the major source PSD pre-construction permitting requirements; control technology evaluations to determine Federal BACT and LAER, as well as state control technology requirements; air quality screening modeling and refined modeling for those pollutants subject to PSD review or state modeling requirements including determining impacts in PSD Class I areas to satisfy Federal Land Manager requirements; liaison with the regulatory agencies responsible for issuing the air quality permits; and related permitting assistance.

Consultant on atmospheric diffusion modeling to more than 50 electric utility and industrial companies, the U.S. EPA, the Army Corps of Engineers, and several state and local governments for existing and proposed new facilities.

Consultant responsible for developing environmental management systems consistent with the ISO 14001 standards for environmental management systems. Principal investigator in developing environmental management systems at four facilities. Completed training course for certification as auditor of environmental management systems for compliance with the ISO 14001 standard.

Chairman of the ISO 14000 Intercommittee Task Force of the Air and Waste Management Association responsible for the training and dissemination of information on ISO 14000 to the largest professional association in North America devoted to air pollution and waste management with over 16,000 members.

Served as Chairman of the Meteorology Committee of the Air and Waste Management Association (AWMA). Organized and directed an evaluation of the U.S. EPA proposed revisions to the Guideline on Air Quality Models that was conducted by the AWMA Meteorology Committee. Coordinated the committee's review of the Guideline, prepared the final committee position statement, and organized and chaired the committee presentation and panel discussion at the U.S. EPA Modeling Conference to discuss the Guideline.

Served as Chairman of the Meteorology and Modeling Committee of the Technical Advisory Committee to the Allegheny County (Pennsylvania) Department of Health on the development of new air pollution regulations for that county.

Private industry projects have included diffusion modeling studies and associated analyses to aid in developing air pollution regulations for existing power generation facilities within a number of states including Delaware, Colorado, Florida, Illinois, Indiana, Michigan, Missouri, New Jersey, New York, Ohio, Pennsylvania, and Wisconsin.

Participated in particulate deposition monitoring and particle identification and attribution program for coal fired power generation facility.

Designed and developed Enviroplan Consulting's Power Plant Siting Database which includes analyses of the PM_{2.5} monitoring data collected nationally for 1999 through 2002.

Directed large scale field studies and research programs to quantify the most extreme vertical dispersion rates governing plume dispersion based on remote plume sensing data and air quality and meteorological monitoring data. He has developed models for plume transport in complex terrain based on aerial tracer studies. He has also participated in the development of models for treating building-effect downwash and fumigation due to gradient onshore flows from water bodies. He has served as a consultant to various electric utilities on studying the variability in SO₂ emission rates from coal-fired power plants and on developing proposed compliance methods for SO₂ emission limits.

Directed a study for the Chemical Manufacturers Association on analysis of data from bagging of equipment leaks for more than 20 chemical plants to develop more accurate procedures for estimating fugitive emissions from equipment leaks.

Testified at numerous public hearings and administrative proceedings representing clients as an expert witness on air quality modeling, PSD permitting and all aspects of compliance with air pollution regulations.

Responsible for developing risk management plans and the five year updates to these plans to satisfy requirements under Section 112(r) of the 1990 Clean Air Act Amendments including hazard assessments, emergency response program development and prevention programs.

Responsible for administrative oversight and general management of large contract for state air pollution control agency over six year period to prepare construction permits and more recently Title V operating permits for large cross section of industry.

Project manager for contract with state air pollution control agency in the Southeast to operate the majority of the state's air quality monitoring program including 19 continuous monitors for ozone, NO_x, SO₂, and CO; 19 PM₁₀ monitors; 29 PM_{2.5} monitors; and 60 air toxics samplers for metals, PUF, VOC, lead and carbonyl. Work involved full operation and maintenance, data analysis and reporting as well as quality control activities and performance audits.

Consultant to the Massachusetts State Highway Department as expert witness on air pollution emissions estimation and air quality modeling in litigation involving the Central Artery highway project -- the largest current public transportation project in the U.S.

Consultant to The Port Authority of New York and New Jersey on air pollution emissions estimation, air quality modeling and transportation consistency determinations required under the Clean Air Act for new transportation project. Work has included the JFK Airport Light Rail Access System and the redesign of Jamaica Station.

Consultant to various state transportation agencies to estimate emissions and predict air quality impacts using various emissions and air quality models.

Senior Reviewer for the design, supply and operation of PSD and other air quality and meteorological monitoring networks.

Consultant on development of Compliance Assurance Monitoring plans to satisfy Title V operating permit requirements.

Consultant on community right-to-know reporting of toxic chemical releases as required under Section 313 of the Superfund Amendments and Reauthorization Act Title III. Designed release estimation procedures and conducted seminars for chemical company personnel on these procedures.

Consultant on designing programs for equipment leak testing and mass emissions sampling from equipment components. Participated in EPA and Chemical Manufacturers Association meetings on developing protocols for equipment leak testing. Organized technical sessions and conferences at which equipment leak testing procedures and results were presented.

PUBLICATIONS

Ellis, H.M., Pan, S., Pinto, A.A, Shannon (Handley), J.C., and White, T.L. (2009) "Summary of State Activities Including Control Strategies and Modeling Plans to Attain the New 24-Hour PM2.5 NAAQS". Presented at the EUEC Energy and Environment Conference, February 2-4, 2009.

Ellis, H.M., Manousos, P., Pan, S., and White, T.L. (2009) "Electric Power Company Strategy for Attaining the 24-Hour PM2.5 NAAQS by using the U.S. EPA Exceptional Events Rule". Presented at the EUEC Energy and Environment Conference, February 2-4, 2009.

Ellis, H.M., Handley, J.C., Pinto, A.A., White, T.L. (2007) "Changes in State and Local Air Pollution Compliance Practices Due to Increased Title V and Other Permit Recordkeeping and Reporting Requirements". Presented at the Air & Waste Management Association 100th Annual Meeting, Pittsburgh, PA, June 22-24, 2007.

Ellis, H.M., Yousuf, A.A., Bent, A., Roy, Seema, Thotakura, R., Ogunsola, F. (2004) "Projected PM2.5 Attainment Status of Each County in the U.S. and Strategies for Dealing With Nonattainment Designations and With the Proposed Interstate Air Quality Rule". Presented at the Air & Waste Management Association 97th Meeting, Indianapolis, IN, June 22-24, 2004.

Ellis, H.M., Thotakura, R., Pan, S., Hirtler, M. (2004) "Permitting Practices, Resources and Performance of State Air Pollution Control Agencies". Presented at the Air & Waste Management Association 97th Annual Meeting, Indianapolis, IN, June 22-24, 2004.

Yousuf, A.A., Hydari, N.H., Earls, P.A., Ellis, H.M. (2003) "Second Annual Survey of the Most Recent BACT/LAER Determinations for Combustion Turbines by State Air Pollution Control Agencies". Presented at the Air & Waste Management Association 96th Annual Meeting, San Diego, CA, June 22-26, 2003.

Dittenhoefer, A.C., Ellis, H.M., Yousuf, A.A., Hydari, N.H., Bent, A. and Roy, S. (2003) “Projected Attainment Status of Each County in the U.S. with the PM_{2.5} National Ambient Air Quality Standards Based on 1999-2001 Monitoring Data and Strategies for Dealing with Nonattainment Designations”. Presented at the Air & Waste Management Association 96th Annual Meeting, San Diego, CA, June 22-26, 2003.

Ellis, H.M., Hirtler, M.F., and Dittenhoefer, A.C. (2002) “New Developments Impacting Air Pollution Construction Permitting for New Combustion Turbines”, EM Magazine, July 2002.

Ellis, H.M., and Lippincott, B. (2002) “Survey of the Difficulty of Obtaining Environmental Permits for the Construction and Operation of New Power Generation Capacity in 28 States”. Presented at the Air & Waste Management Association 95th Annual Meeting, Baltimore, MD, June 24-28, 2002.

Hydari, N.H., Yousuf, A.A. and Ellis, H.M. (2002) “Comparison of the Most Recent BACT/LAER Determinations for Combustion Turbines by State Air Pollution Control Agencies”. Presented at the Air & Waste Management Association 95th Annual Meeting, Baltimore, MD, June 24-28, 2002.

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Ellis, H.M., Hirtler, M.F., and Dittenhoefer, A.C. (2001) “Impact of New Regulatory and Technological Developments on Obtaining Air Pollution Construction Permits for New Combustion Turbines for Electric Power Generation and Strategies for Dealing with These Developments”. Presented at the Air & Waste Management Association 94th Annual Meeting, Orlando, Florida, June 24-28, 2001.

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Ellis, H.M., Dittenhoefer, A.C. and Fridley, W. (1998). “Developing Environmental Management Systems Based on ISO 14000 Principles for Companies in the Metals Industries: Why and How”. Presented at Air & Waste Management Association Specialty Conference on Environmental Innovations in the Metals Industry”, Pittsburgh, PA, March 1998.

Ellis, H. M., Plante, V., Arruda, C. (1995) “Successful Service Support Strategies for 40CFR75 CEM Systems”, Presented at Air & Waste Management Association International Conference: Continuous Compliance Monitoring Under the Clean Air Act Amendments, Chicago, IL, October 25-27, 1995.

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Ellis, H.M., Logan, M., and Chiu, C. and Tufts, S.A., PPG Industries (1984) "Investigation of Plume Dispersion Using Lidar Plume Measurements." Presented at 77th Annual Meeting of the Air Pollution Control Association, San Francisco, California, June 1984.

Ellis, H.M., Greenway, A.R., and Duplak, E., (1982) "Summary of the Federal Emissions Trading Policy Statement." Journal of the Air Pollution Association, August 1982.

Ellis, H.M. (1982) "Evaluation of Prediction Models for the Avon Lake Power Plant Under Unstable Meteorological Conditions". Third Joint Conference on Applications of Air Pollution Meteorology, January 12-15, 1982, San Antonio, Texas. Published by the American Meteorological Society, Boston, Massachusetts.

Ellis, H.M. and Liu, P.C. (1981) "Review of the Performance of the RAM Model in Predicting Highest Measured Concentrations." Journal of the Air Pollution Control Association, Vol. 31, No. 2, February 1981, pp 148-152.

Ellis, H.M. and Greenway, A.R. (1981) "The Prevention of Significant Deterioration of Air Quality - Summary of the Final Federal Regulation," Journal of the Air Pollution Control Association, Vol. 31, No. 2, February 1981, pp 136-138.

Ellis, H.M. and Liu, P.C., Enviroplan, Inc., and Runyon, C., Ohio Edison Co. (1980) "Comparison of Predicted and Measured Concentrations for 58 Alternative Models of Plume Transport in Complex Terrain," 72nd Annual Meeting of the Air Pollution Control Association, Cincinnati, Ohio, June 1980.

Ellis, H.M., Liu, P.C., and Dalzell, G. (1980) "Comparison Study of Measured and Predicted Concentrations with the RAM Model at Two Power Plants Along Lake Erie," Second Joint Conference on Applications of Air Pollution Meteorology, New Orleans, Louisiana, March 24-27, 1980.

Ellis, H.M. and Liu, P.C. (1980) "Discussion - An Air Quality Performance Assessment Package," Atmospheric Environment, Vol. 14, 1980, pp 1113.

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Ellis, H.M. and Liu, P.C. (1977) "Comparison of Maximum Measured and Maximum Predicted SO₂ Concentrations with the U.S. EPA Single Source (CRSTER) Model," 70th Annual Meeting of the Air Pollution Control Association, Toronto, Ontario, Canada, June 20-24, 1977.

Ellis, H.M., Guise, D., and Liu, P.C. (1975) "Predicting SO₂ Impact from 1000-MW Power Plant," Power, July 1975.

Ellis, H.M. and Keeney, R.L. (1972) "A Rational Approach to Governmental Decisions Concerning Air Pollution," Journal of Systems Engineering, Vol. 3, No. 1, Summer 1972.

PROFESSIONAL CERTIFICATION

Qualified Environmental Professional, Certificate No.7990037, Institute of Professional Environmental Practice

EDUCATION

B.S., Electrical Engineering, Massachusetts Institute of Technology

M.B.A., Harvard Graduate School of Business Administration

D.B.A., Harvard University. Doctoral dissertation concerned with development of rational approaches to government decisions concerning air pollution.

Training course to become a certified auditor of ISO 14000 environmental management systems

AFFILIATIONS

Member of The Climate Registry, Expert Panel for Development of the Electric Power Company GHG Emissions Inventory Protocol; Former Member Editorial Review Board, EM Magazine; Former Chairman, ISO 14000 Intercommittee Task Force, Air and Waste Management Association; Former Chairman, Air Toxics Source Emissions Characterization Committee, Air and Waste Management Association; Current Member and Former Chairman, Critical Review Subcommittee of Publications Committee, Air and Waste Management Association; Former Chairman, Meteorology Committee, Air and Waste Management Association.

RON BALDWIN

AREAS OF SPECIALIZATION

Ron Baldwin is Business Development Director, Wind Energy Services. He has significant experience as a business developer in both the meteorological and electric utility industries. Mr. Baldwin has successfully negotiated and provided meteorological services to more than three hundred wind energy and electric utility companies. He has assisted with both the development and operations of many major wind farms across the United States and Canada.

Mr. Baldwin has over eight years of experience in providing meteorological consulting and services to the electric utility industry and wind energy industry. He has provided load forecasting and real time weather information to variety of departments across the electric utility industry. He has provided safety consultation for meteorological data and services for many major wind energy companies.

Mr. Baldwin also has five years of experience working in the transmission, distribution and nuclear departments within the electric utility industry. He has assisted in the monitoring, maintenance and repair of both the electric distribution and transmission grids. He is an NRRPT certified Radiological Consultant. He has conducted air monitoring and various other types of monitoring in the nuclear power industry across the United States.

WIND ENERGY DEVELOPMENT EXPERIENCE

Mr. Baldwin has consulted with customers in the wind energy market in development, operations, maintenance, land acquisition and marketing. He has provided customers with forecasting, lightning, radar and other vision products for the successful safety and operations of wind farms.

He has successfully assisted with wind development projects for General Electric, Vestas, Florida Power & Light, Invenergy, Mid American Energy, Horizon, Nebraska Public Power District, Oklahoma Gas & Electric, AES, Noble power, Storm Lake Power Partners, Gamesa, Acciona, Duke Energy, and Clipper Wind Energy.

EDUCATION

BAS. Major in Nuclear Technology, Indiana University

AAS. Major in Radiation Protection Technology, Metropolitan Community College, Omaha, NE

THOMAS FERREBEE III

AREAS OF SPECIALIZATION

Quality Assurance Coordinator and Senior Air Pollution and Meteorological Monitoring Engineer. Perform quality assurance audits and acceptability tests on air pollution and meteorological monitoring instrumentation. Managed and supervised the operation and maintenance of a 40 site/station state air quality monitoring network including 29 PM2.5 samplers. Install, service, troubleshoot, repair and calibrate instrumentation, data acquisition systems and equipment for monitoring air quality. Train and support field operators. Proficient in the operation, maintenance, calibration, service and repair and quality assurance of Andersen Instruments air sampling equipment including General Metal Works (GMW) and Graseby Andersen RAAS PM2.5 Air Sampler, Dichotomus Air Sampler, PM10 Hi-Vol Air Sampler, TSP-1 Air Sampler, AVOCS Sampler, Beta Attenuation Monitor; Thermo Environmental Instruments (TECO) Gas Analyzers: SO₂, CO, NO_x, R&P Partisol PM10 Sampler, TEOM PM10 Sampler; CSI 1700 Gas Dilution Calibrator.

PROJECT EXPERIENCE

Field Engineer/Manager with extensive experience troubleshooting air sampling monitors and instrumentation, and problem solving network configurations and applications. Demonstrating flexibility and effectiveness handling complex air pollution projects and multiple air quality network tasks.

All Enviroplan Consulting Air Quality Monitoring Networks: Quality Assurance Coordinator responsible for quarterly performance and systems audits satisfying the requirements of 40 CFR Part 58 and applicable state regulations.

State of Georgia, Georgia Department of Natural Resources (for Enviroplan Consulting): Field Manager and Supervisor for the routine operation of a 40 site/station SLAM Network. The network collected samples and monitored the air for 13 pollutant parameters: TSP Lead, TSP Metals, PUF, VOC TO14, Carbonyl, PM10, PM2.5, SO₂, CO, NO, NO_x, NO_y and Ozone. Trained 12 operators on daily operation, maintenance, and preventive maintenance of samplers and monitors at each site/station. Perform calibrations, precision checks and quality assurance audits on the sampling and measuring instrumentation.

Anderson Instruments, Inc.: Provided technical support to customers and end users of air sampling monitors and instrumentation. Performed nationwide installations, preventive maintenance, calibrations, and field repairs of air sampling equipment for quick start ups and continuous optimum performance. Evaluated and wrote procedures for quality assurance testing, operator and service manuals. Managed the technical and customer service department in the absence of the department managers. Identified customer needs and made system or corrective action recommendations for optimum product applications. Evaluated and tested instrumentation designs, configurations, and applications for compliance with the Environmental Protection Agency Code of Federal regulations.

EDUCATION

Bachelors of Science Degree, Electronic Engineering Technology, Savannah State University

MICHAEL F. HIRTLER, CCM

AREAS OF SPECIALIZATION

Vice President with 23 years consulting experience in Enviroplan Consulting's Environmental Studies Division. Areas of specialization include Part 70 (Title V) air permitting, and state and federal New Source Review (NSR) and Prevention of Significant Deterioration (PSD) air permitting. Criteria pollutant air dispersion modeling as part of NSR/PSD permitting and SIP revisions. Dispersion modeling of hazardous air pollutant (HAP) source releases including hazard assessments required under Section 112(r) of 1990 Clean Air Act Amendments. Point source and fugitive air pollutant emissions inventory development.

PROFESSIONAL CERTIFICATION

Certified Consulting Meteorologist, No. 504, American Meteorological Society.

PROJECT EXPERIENCE

Mr. Hirtler has acted in both a technical and managerial capacity for many air permitting and dispersion modeling analyses conducted in support of new/modified source permits. This includes hazard assessments and other air-pathway health risk analyses of hazardous air pollutants to assess potential for human exposure. Selected project experience is presented below:

SELECT AIR PERMITTING EXPERIENCE

Alaska Department of Environmental Conservation: Project Manager to assist the Division of Air Quality with multiple technical assistance projects on an as-needed basis. The projects may include some or all of the following: preparation of major source Title V operating permits; preparation of Title I minor and major source permits, including Prevention of Significant Deterioration (PSD) and synthetic minor, i.e., Owner Requested Limit (ORL) permits; performance of routine and/or full compliance reviews and evaluations; performance of technical services involving the Department's Quality Management System (QMS) used to develop training material, internal procedures and work instructions for compliance/enforcement activities and the Department's AIRTOOLS used to input source compliance and permit data to database software; evaluation of air dispersion modeling protocols, analyses and study reports, and performance of air modeling as needed, to ensure compliance with EPA (Guideline on Air Quality Models) and state modeling procedures established air quality increments, air quality standards, other established thresholds and standards and emission control efficiencies and permit limitations; evaluation of visible impact assessments for BART affected sources and applicant visibility modeling analyses for source impacts at local air sheds, Class I areas and prescribed fire approvals; review of PSD permit application Class I area impact assessments to ensure compliance with AQRVs established by Federal Land Manager and the Department for

the specific Class I area, including visible impacts (regional haze), acid deposition and other environmental parameters as necessary; and collect, analyze, audit, quality assure and process monitored meteorological and/or ambient air pollutant data in accordance with EPA's volumes for *Quality Assurance Handbook for Air Pollution Measurement Systems* and EPA's *Meteorological Monitoring Guidance for Regulatory Modeling Applications* and standard meteorological practices.

Kentucky Division for Air Quality: Project Manager to assist the state agency in issuance of construction/operating permits for minor sources and conditional major and Part 70 (Title V) source operating permits for various industries. Projects involve the review of permit application for completeness and technical accuracy, calculating potential and allowable emissions, modeling, conducting regulatory review and compliance assessments with applicable state and federal regulations, review of NSPS, NESHAP, issuing draft and final permits, including special operating conditions (e.g., operating limits for Conditional Major), testing, record keeping and reporting requirements, and response to comments after formal public notice and EPA review. Responsibilities include review and quality assurance of deliverables prior to submittal to Division; assist with resolution of complicated permitting issues; maintain direct contact with Permit Review Branch chief and Permit Support section supervisor regarding project status; provide periodic status reports relating to project milestones and their completion; and project invoicing and accounts records maintenance.

Indiana Department of Environmental Management, Office of Air Quality: Principal Investigator to assist state agency in issuance of air permits under three separate permitting programs: 1) state construction permits for new/modified minor sources, 2) Federally Enforceable State Operating Permits (FESOPs) for Part 70 synthetic minor sources, and 3) Part 70 (Title V) operating permits. General permit issuance responsibilities include review of application materials for completeness and technical accuracy; computation of source-wide potential emission rates for all applicable air pollutants; determination of applicable state and federal air rules; compliance status with applicable air rules; preparation of draft permits, establishing special operating conditions, testing, record keeping and report requirements; issuance of draft permits for public notice; respond to all comments received during and immediately following the public notice period, including comments from the public, applicant, U.S. EPA, and surrounding state agencies; revise draft permit as needed; and issue final permit. A wide range of industrial source categories have been permitted, including hot mix asphalt batch plants; concrete batch plants; sand and gravel quarries; surface coating operations, including spray painting operations, printing operations, fiberglass reinforced plastics operations; secondary metals production, including iron and aluminum foundries and die casting operations; petroleum storage and transfer terminals; casket manufacturing; recreational vehicle manufacturing; and many other industrial source categories.

City of Indianapolis, Office of Environmental Services (OES): Project Manager to assist OES, as a local agency with delegated IDEM and EPA authority to issue air permits, in the issuance of air construction and operating permits for various industries. Project involves the review of new and modified Registration, MSOP, FESOP, and Part 70 (Title V) permit applications for completeness and technical accuracy; calculating potential and allowable emissions; conducting regulatory reviews and compliance assessments with applicable state and federal regulations; review of BACT, MACT, NSPS and NESHAP; issuing draft and final permits, including special operating conditions (e.g. operating limits for FESOP), compliance monitoring requirements, testing, record keeping and reporting requirements; and response to comments after formal public notice period.

Allegheny County Health Department: Project Manger for air permitting project involving preparation of 12 Title V permits in the Pittsburgh, PA metropolitan area. Sources included chemical plants, coal fired power generation plant, land fills, steel mill, metals finishing facility, airline maintenance facility and various other industries. Responsibilities include review and quality assurance of deliverables prior to submittal to Department; assist with resolution of complicated permitting issues; maintain direct contact with Department section chief regarding project status; provide periodic status reports relating to project milestones and their completion; and project invoicing and accounts records maintenance.

FirstEnergy Corp.: Project Manager for two air permitting projects, with one project involving a major PSD source modification at an existing power station and one for a new PSD-synthetic minor greenfield power station. Both projects included the installation of multiple simple cycle combustion turbines, and entailed a determination of source applicability to PSD requirements through emissions computations. Conducted air dispersion modeling analyses to demonstrate insignificant air quality impacts. Assisted with BACT analysis preparation. Conduct meetings with client and permitting authority. Prepared air permit application and final technical report summarizing study methodologies, results, and conclusions.

Bethlehem Steel Corp., Laclede Steel (3 separate plants), Gulf States Steel, Acme Steel, Koppers Industries (2 separate plants) and Damascus Tube: Project Manager and Principal Investigator on studies involving preparation and submittal of Part 70 permit applications. Primary involvement included regulatory assessment, including review of facility operations; review of existing air permits and specific operation conditions; and review of state and federal air regulations to determine regulatory applicability and compliance. Provided support on application preparation and emissions calculations. Also prepared technical supporting documents when needed.

Bethlehem Steel Corp.: Project Manager for PSD permitting study to modernize melt shop operations and increase SO₂ allowable emission rate. Determined source applicability to PSD requirements through extensive emissions netting computations. Implemented innovative multimodel dispersion analysis using BLP/ISC/Complex I/RTDM. Assisted with BACT analysis preparation. Attended meetings with regulatory agency. Prepared air permit application and final technical report summarizing study methodologies, results, and conclusions.

New Jersey Department of Environmental Protection: Principal Investigator to assist the state agency with the review air quality modeling protocols, analyses and study reports submitted in support of air pollution control permit applications. Project involved the determination for accuracy of stationary source air quality modeling study submittals with respect to NJDEP and U.S. EPA guidance. Responsible for completeness review of modeling studies; accuracy of technical analyses; recommendations to NJDEP regarding study deficiencies, if any; and approvability of studies.

SELECT AIR QUALITY MODELING EXPERIENCE

U.S. Pipe, Sloss Industries, American Cast Iron Pipe Company and ABC Coke in Birmingham, AL: Principal Investigator for study to apply the AERMOD dispersion model to an inventory of PM_{2.5} emitting sources developed for each facility in support of each plant's PM_{2.5} RACT plans required for submittal to the Alabama Department of Environmental Management. The study included the establishment of full plant emission inventories for each facility; the use of hourly emissions files that reflect actual source operating schedules; and the development of buoyancy plume height parameterization for fugitive hot gaseous releases that would otherwise be treated as neutrally buoyant in AERMOD.

Sloss Industries and ABC Coke in Birmingham, AL and Solutia, Inc. in Decatur, AL: Principal Investigator for study to apply the CALPUFF Model to determine whether certain BART-eligible emission units at each of the three plants were subject to BART requirements of the *Protocol for the Application of the CALPUFF Model for Analyses of Best Available Retrofit Technology (BART)* prepared August 16, 2006 by the Visibility Improvement State and Tribal Association of the Southeast (VISTAS). Assisted the Project Manager in ensuring CALPUFF dispersion modeling conducted by modeling principal investigator was done in accordance with the protocol; assisted in results summarization; conducted quality assurance of the modeling files and post-processing related files and data; and assisted with report preparation.

Engineering and Construction Company: Project Manager for study to determine offsite styrene odor impacts due to fiberglass reinforced plastic (FRP) product being manufactured at a at an existing power plant for use as a stack liner in a new tall stack. ISCST3 and SCREEN3 modeling was conducted to produce off-site styrene concentration estimates for each of 11 FRP building stack release scenarios. A literature search was conducted to ascertain the most appropriate styrene odor detection threshold for use in the study, which typically reflects the lowest concentration of a substance that can be detected above a blank sample by 50% of panel testers, and is a standard metric used in odor assessment analyses. Based on use of a U.S. EPA 1-hour average odor threshold for styrene, all model predicted concentrations were adjusted to reflect peak (3-minute) average concentrations, and the overall worst-case predictions were compared to a styrene odor detection threshold.

Conectiv (as former Delmarva Power & Light Company): Principal Investigator for modeling study to assist the utility in selecting a site for the installation of two new gas turbines. Performed urbanization analysis for four potential sites to determine land-use type. Determined GEP formula stack height. Processed meteorological data. Determined the potential for aerodynamic downwash of pollutants due to source proximity to nearby structures. Performed dispersion modeling considering urban vs. rural land use, complex vs. simple terrain, and downwash vs. non-downwash cases for four potential sites. Applied CALPUFF for the assessment of project impacts at nearest Class I area and to determine project related impacts on Class I air quality related values, including the potential for regional haze.

Conectiv (as former Delmarva Power & Light Company): Principal Investigator for modeling study to assist the utility in selecting a site for the installation of two new gas turbines. Performed urbanization analysis for four potential sites to determine land-use type. Determined GEP formula stack height. Processed meteorological data. Determined the potential for aerodynamic downwash of pollutants due to source proximity to nearby structures. Performed dispersion modeling considering urban vs. rural land use, complex vs. simple terrain, and downwash vs. non-downwash cases for four potential sites. Applied CALPUFF for the assessment of project impacts at nearest Class I area and to determine project related impacts on Class I air quality related values, including the potential for regional haze.

FirstEnergy: Project Manager on two (2) air construction permitting studies for merchant power plant facilities located in Ohio. One study was subject to major new source PSD permit review, and one study was a new PSD synthetic-minor subject to state-only permit review. Responsible for client contact, interfacing with the state agency, dispersion modeling protocol preparation and submittal, dispersion modeling analyses, including downwash and cavity region analyses, oversight on Best Available Control Technology (BACT) and Best Available Technology (BAT for state-only) determinations, final report preparation, and air permit preparation.

FirstEnergy (as former Ohio Edison Company): Project Manager on study to evaluate and obtain agency approval for revision to SO₂ SIP allowable emission rates for the W. H. Sammis Power Plant. Performed detailed interactive modeling of the power plant with other SO₂ sources within modeling domain using ISC/Complex I/RTDM/CTSCREEN. Conducted detailed analysis of measured background data. Attended meetings with regulatory agency. Prepared final technical report.

Two Chemical Manufacturers and Paper Manufacturer: Principal Investigator for several risk management program (RMP) studies conducted pursuant to the requirements of Section 112(r) of the 1990 Clean Air Act Amendments. As a component to RMP hazard assessments, conducted offsite consequence modeling of each subject chemical/process using U.S. EPA approved dense gas/neutrally buoyant type dispersion models. The analysis was used to determine the potential for exposure to nearby populations due to an accidental release of a regulated contaminant.

Bethlehem Steel Corp.: Project Manager for PSD permitting study to modernize melt shop operations and increase SO₂ allowable emission rate. Determined source applicability to PSD requirements through extensive emissions netting computations. Implemented innovative multimodel dispersion analysis using BLP/ISC/Complex I/RTDM. Assisted with BACT analysis preparation. Attended meetings with regulatory agency. Prepared air permit application and final technical report summarizing study methodologies, results, and conclusions.

Fortune 500 Pharmaceutical Company (Confidential Client): Project Manager to assess the potential for human exposure to 14 HAPs emitted from a large chemical complex. Processed hourly NWS meteorological data into STAR summary data. Developed an emissions inventory for point and fugitive sources. Determined the potential for aerodynamic downwash of pollutants due to stack location and nearby building configurations. Performed air dispersion modeling analysis to determine long term concentration predictions at nearby sensitive locations.

Northern Indiana Public Service Company: Principal Investigator for study to obtain a Permit to Construct for a new stack associated with facility installation of an Advanced Flue Gas Desulfurization unit. Conducted dispersion modeling to determine state SIP compliance for SO₂. Demonstrated through detailed fugitive particulate emission rate calculations that the facility was not subject to PSD review for PM due to plant-wide net reductions. Responsible for development of a roadway fugitive dust control plan. Prepared final report and permit applications.

Fortune 100 Company (Confidential Client): Project Manager for study to determine concentrations at rooftop and ground level fresh air intakes for HAPs emitted from surface rooftop vents. Conducted literature search for relevant guidance on predicting building rooftop and air intake concentrations, estimated emissions for catastrophic release scenarios, developed computerized algorithm to simulate prediction procedures, prepared final report detailing modeling methodologies, results, and source exhaust placement recommendations.

Cogeneration Developers: Project Manager on three separate studies for cogeneration facilities located in rural New York State and subject to PSD review. Responsible for client contact, interfacing with the state agency, dispersion modeling protocol preparation and submittal, dispersion modeling analyses, including downwash and cavity region analyses, Best Available Control Technology (BACT) analyses, final report preparation, and air permit preparation.

Cogeneration Developers: Principal Investigator on four separate PSD studies of cogeneration facilities located in rural Pennsylvania. Processed multiple years of NWS meteorological data. Estimated allowable source emission rates. Determined potential for aerodynamic building downwash effects. Performed dispersion modeling in both simple and complex terrain to determine impacts due to proposed sources. Assembled background emissions inventory, including other increment consuming sources, performed refined modeling to determine total increment consumption and NAAQS compliance for applicable pollutants, and performed visibility screening analyses.

FirstEnergy Corp. (as former Cleveland Electric Illuminating Co.): Project Manager on study to determine placement of three PM10 monitors at a new coal ash repository. Determined short-term and annual fugitive PM10 emissions from planned activities at the new site. Conducted dispersion modeling of related dust generating activities to determine locations of maximum short term and annual impacts. Assessed compliance with related NAAQS and made recommendations on controls and work practice modifications to meet the air standards. Recommended siting for one "upwind" monitor, one fixed location "downwind" monitor and, due to constantly shifting activities at the new facility, one mobile "downwind" monitor.

PUBLICATIONS

Ellis, H.M., Thotakura, R., Pan, S. and Hirtler, M. (2004), "Permitting Practices, Resources and Performance of State Air Pollution Control Agencies", Air & Waste Management Association Annual Meeting 97th Annual Meeting, Indianapolis, IN, June 2004, Paper # 412.

Ellis, H.M., Hirtler, M.F., and Dittenhoefer, A.C. (2002), "New Developments Impacting Air Pollution Construction Permitting for New Combustion Turbines", *EM (Environmental Manager)*, July 2002

Ellis, H.M., Hirtler, M.F., and Dittenhoefer, A.C. (2001) Impact of New Regulatory and Technological Developments on Obtaining Air Pollution Construction Permits for New Combustion Turbines for Electric Power Generation and Strategies for Dealing with These Developments, Air & Waste Management Association 94th Annual Meeting, Orlando, Florida, June 24-28, 2001.

Dittenhoefer, A.C., Fleck, C.M., Hirtler, M.F., and Pan, S.C. (1997) Hazard Assessment Modeling Under Clean Air Act Section 112(r) at Iron and Steel Facilities, Air & Waste Management Association 90th Annual Meeting, Toronto, Canada, June 8-13, 1997.

EDUCATION

Graduate Coursework, Atmospheric Science, University of Illinois at Champaign-Urbana
B.S., Meteorology, Cook College at Rutgers University

AFFILIATIONS

American Meteorological Society
Air and Waste Management Association

JAMES R. MAHONEY, Ph.D.

AREAS OF SPECIALIZATION

Dr. Mahoney focuses on research in the basic atmospheric sciences; consultation on planning and design of air pollution prevention and greenhouse gas emission limitation systems including wind energy mitigation projects; and international climate management advisory studies conducted in approximately 45 nations throughout the world. Following his retirement in 2006 as Deputy Director of the National Oceanic and Administration as Director of the U.S. Climate Change Science Program, he joined Enviroplan Consulting on a part time basis.

EXPERIENCE

He has committed approximately seven and one half years to the leadership of two major international programs involving key contributions by the government of the United States. He was appointed by President Reagan to be Director of the U.S. Acidic Deposition Assessment Program in January 1988, serving until the completion of the program in early 1991. In 2002 he was appointed by President Bush to be Director of the U.S. Climate Change Science Program, involving thirteen federal agencies and annual budgets of approximately \$2 billion through April 2006.

In both the acid deposition program in the 1980's and the climate change studies in the early years of the twenty-first century, Dr. Mahoney was responsible for the overall planning, computer model simulations and international reporting of the findings and national and international implications of these extensive studies. The two major study programs represent the state-of-the-art in the development of regional, national and global scale insights and control strategy development regarding these critically important environmental challenges.

He has five years experience serving as a government administrator and consultant in climate change and environmental sustainability activities and overall 42 years experience in air pollution consulting and other environmental areas.

Climate Change and Environmental Sustainability Activities

2002 – 2006 (March): Assistant Secretary of Commerce for Oceans and Atmosphere and Deputy Administrator of the National Oceanic and Atmospheric Administration (NOAA).

2003 – current. Member and co-chairman (since 2004) of the *Roundtable on Science and Technology for Sustainability* sponsored by the U.S. National Academy of Sciences. The NAS Roundtable has approximately 30 members, including high level scientific and technological corporate officers, the leaders (principally at the Presidential Appointee level) of the relevant federal organizations, leaders of major nongovernmental organizations, and former elected officials. The Roundtable seeks to enhance sustainability within the United States and throughout the world by improving the use of technical information by commercial organizations and government regulatory and planning units. The Roundtable has sponsored case study reviews open to the public, written and verbal sustainability communication programs, and has continued development of the definitions and practices underlying sustainability.

2002 – 2006: Director of the U.S. Climate Change Science Program (CCSP) while serving as Deputy Administrator of NOAA (see above also). CCSP is the largest climate change program in the world, and much of CCSP's \$2 billion annual budget supports work by contractors and government laboratories on important sustainability issues. Some examples are: (1) many CCSP programs deal with ecosystem effects of changing climate parameters, and therefore with mitigation and adaptation practices to reduce adverse impacts; (2) the science programs sponsored by CCSP are closely coordinated with the technology development programs sponsored by the related Climate Change Technology Program (CCTP), leading to the development of best engineering and operating practices, and continued improvements in the evaluations of emission rates from industrial facilities; and (3) this CCSP experience is at the leading edge of the development of effective sustainability practices in many geographical regions and industry sectors, with the added advantage that the credibility of the work is enhanced because of its sponsorship by government rather than interested parties.

2002 – 2006: Executive oversight of U.S. Sustainable Fisheries activities. The Sustainable Fisheries Act (1996) assigned to NOAA the responsibility to oversee and implement the nation's sustainable fisheries programs. As Deputy Administrator of NOAA I participated in the "corporate" management and strategy development for these programs, including priority setting, budget development and effectiveness reviews for the programs. NOAA's programs include maintaining healthy fish stocks; eliminating overfishing and rebuilding overfished stocks; and increasing the long-term economic and social benefits to the nation from living marine resources.

2003: Invited speaker at the Delhi Sustainable Development Summit, sponsored by the Government of India. The summit was an "action oriented" follow-on to the World Summit on Sustainable Development sponsored by the United Nations Environment Program in Johannesburg in 2002.

2000 – 2001: Advisor on sustainable development to the Planning Minister of the Hong Kong Special Administrative Region (SAR) of China. This work assignment involved the review of the new Hong Kong 5-year plan for sustainable environmental practices for the SAR and the Pearl River Delta; comparisons with similar sustainability programs established for other regions around the world; and summarizing recommendations in a written report and keynote address to the Hong Kong Sustainability Workshop of 2001.

Other Experience

1979 – 1982: Advisor to the Chief of the Federal District of Mexico (the “Mayor of Mexico City”) and the Federal Secretariat of Public Health, to address the unsustainable poor air quality in the Valley of Mexico, under the influence of rapidly growing population, motor vehicle usage and industrialization in the Valley of Mexico. The work involved the recruitment of twelve international experts to develop recommendations and action programs. The program was suspended in late 1982 (at the end of the term of Mexican President Jose’ Lopez Portillo), and a new program was initiated in the later 1980’s which continues today.

1973 – 1995: Advisor to the government of the Kingdom of Saudi Arabia (continuous from 1973 to 1983 and continuing intermittently from 1984 to 1995). This work involved the comprehensive development of recommendations for the environmental management program for Saudi Arabia, including organizational structure; comprehensive codes of regulations specifying maximum air emission levels, water effluent rates and toxic waste management practices for major industrial, energy and municipal facilities throughout Saudi Arabia; and recommended personnel recruitment and training practices for the national agency.

1999 – 2002 (March): Environmental management consultant serving U.S. and international clients. Topics included insurance recovery for environmental damages, and technical analysis of regional air quality and haze patterns.

1991 – 1999 (July): Senior Vice President of International Technology Corporation, a \$1+ billion international engineering and construction company pursuing a broad technical specialty environmental business, combined with field construction activity dealing with restoration of contaminated soil and ground water. From 1997 to 1999 also served as President of the Consulting and Engineering Division of the corporation, responsible for a \$200+ million technical business. Also from 1997 to 1999 served as Chairman of the Board and responsible corporate officer for Landbank, Inc., a wholly owned subsidiary addressing the brownfield market by restoring and redeveloping contaminated commercial property sites.

1988 – 1991 (January): Director of the National Acid Precipitation Assessment Program (NAPAP) involving six federal agencies with a combined federal budget of approximately \$100 million annually. The position was in the Executive Office of the President, during the final year of the Reagan administration and during the first two years of the administration of President George H. W. Bush.

1987 – 1988 (February): Environmental management consultant serving U.S. and international clients. Topics included environmental management government organization planning for Saudi Arabia, and environmental permitting issues for large Kraft paper plants.

1984 – 1987 (February): Manager of the Environmental Industries Center of the Bechtel Group, Inc. The Environmental Industries Center addressed environmental compliance, planning and engineering matters for Bechtel's major domestic and international clients.

1983 – 1984 (January): Environmental management consultant serving U.S. and international clients. Topics included strategic planning for a large environmental engineering firm, and comparative studies of international environmental regulations.

1968 – 1983 (September): Co-founder and Senior Vice President of Environmental Research & Technology, Inc. (ERT). ERT began as a start-up in December 1968 and by the late 1970's it had grown to become the largest environmental specialty firm in the United States, with offices and laboratories located throughout the United States combined with a substantial international business operating in several countries in both the developed and developing world. Also served as President of ERT International, Inc., a wholly owned subsidiary responsible for ERT's international business from 1975 until 1983.

1966 – 1973 (June): Assistant Professor and Associate Professor (from July 1970) in the School of Public Health at Harvard University, specializing in environmental health management. During the period from December 1968 through June 1973 I served in two positions: the faculty position at Harvard and the Senior Vice President position at ERT, Inc. (see above).

1962 – 1965 (December): Graduate research assistant in the Department of Meteorology at MIT.

1959 – 1962 (June): Graduate student at MIT, supported by fellowship grants.

1956 – 1959 (June): Laboratory assistant and lecturer in the Physics Laboratories at LeMoyne College.

HONORS

2006: Awarded the U.S. Department of Commerce William C. Redfield Award for outstanding public service, presented by Commerce Secretary Carlos M. Gutierrez.

2002: Confirmed by the U.S. Senate (following nomination by President George W. Bush) to be Assistant Secretary of Commerce.

1990: Elected as a Fellow of the American Meteorological Society.

KEVIN RUGGIERO

AREAS OF SPECIALIZATION

Monitoring Engineer and Data Analyst over the past three years. Experience includes meteorological and air quality data review and quality assurance, field operations technical support, performing network installations and network operations and maintenance for meteorological and air quality monitoring networks.

PROJECT EXPERIENCE

Meteorological and Air Quality Data Analyst. For all of Enviroplan Consulting's current air quality and meteorological monitoring networks, conducts a review of the validity of the collected raw data in accord with the applicable Quality Assurance Project Plan.

Pollution Control Finance Authority of Warren County. Served as field monitoring engineer for this three station SO₂ and meteorological monitoring network in western New Jersey. Work included conducting site checks, trouble shooting and maintenance of the monitoring sites.

Alaska Department of Environmental Conservation. Reviews meteorological and air quality data collected in accord with ADEC Quality Assurance Project Plans for adequacy and acceptability by the state.

Prior to joining Enviroplan, Mr. Ruggiero ran his own construction company for over 12 years performing residential and commercial applications and is licensed by the state of New Jersey. He also has experience in commercial power plant maintenance including power generation and wastewater treatment.

EDUCATION

Bachelor of Science in Finance and a certificate in database programming from Fairleigh Dickinson University

GANESH SRINIVASAN

AREAS OF SPECIALIZATION

Environmental Engineer with over four years experience in use of the MM5 meteorological data base for forecasting wind fields air dispersion modeling, emissions inventory development, air permitting and source sampling.

He has experience working with and revising regional emissions inventories for PM2.5 and Ozone Model Attainment Demonstrations based on EMS2003 and CONCEPT models.

He has also worked on a broad spectrum of air permitting issues including preparation of air pollution construction and operating permits for Title V, FESOP and MSOP sources; regulation applicability determinations; permit drafting and permit finalization including response to public comments. Source sampling experience includes conducting isokinetic source sampling on stationary diesel engines.

AIR QUALITY MODELING AND REGIONAL EMISSIONS INVENTORY REVISION EXPERIENCE

Analyzed regional and local scale emissions inventories for use in CAMx and AERMOD modeling for the 8-hour ozone and annual PM2.5 Model Attainment Demonstrations in the Chicago and Cleveland Nonattainment Areas. Conducted CAMx control scenario analyses for Model Attainment Demonstrations. Revised the regional emissions inventories for the electric generating unit, motor vehicle and off-road engine emission sectors as part of the Attainment Demonstration.

While employed by the Ohio Environmental Protection Agency (OEPA), assembled the regional emissions inventory data generated by the EMS2003 emissions processor. Performed a source Apportionment study to identify various emission source regions and emission categories that contribute significantly to Ohio's Ozone non-attainment regions using the CAMx Model.

Applied CALPUFF and CALPOST models as part of BART analysis for the assessment of project impacts at nearest Class I area for industrial plants in Alabama and Alaska. Attended the five day US EPA course called "Air Pollution Dispersion Models: Theory and Applications" (course included detailed discussion and application of the CALPUFF and CALMET models).

AIR POLLUTION PERMITTING EXPERIENCE

Indiana Department of Environmental Management (IDEM): Permit reviewer for Enviroplan Consulting assisting the state agency in issuance of construction and operating permits for various minor and major sources. Project involves the review of permit applications for completeness and technical accuracy, calculating potential and allowable emissions, conducting regulatory reviews, compliance assessments for applicable state and federal regulations, review of BACT, MACT, NSPS, and NESHAP analyses, issuing draft and final permits (including special operating conditions), compliance monitoring requirements, testing, record keeping, reporting requirements and responding to comments after the formal public notice period.

SOURCE SAMPLING EXPERIENCE

National Institute of Occupational Safety and Health (NIOSH): Under funding from NIOSH, performed isokinetic source sampling (EPA Method 5) on stationary diesel engines as part of a research project studying the effect of engine load on diesel particulate matter. Results from this study were used in constructing a wet electrostatic precipitator in an underground mine.

EDUCATION

M.S., Civil & Environmental Engineering, University of Cincinnati, Ohio, 2002 - 2005
B.E., Instrumentation and Control, University of Madras, India, 1998 - 2002

KATHLEEN M. STANWOOD

AREAS OF SPECIALIZATION

Manager of Data Reduction, Processing, and Reporting and Laboratory Operations. 25 years experience in air quality and meteorological monitoring. Responsible for Enviroplan Consulting's gravimetric laboratory for analysis of particulate matter samples. Fully versed in all phases of data analysis, reduction and report preparation, including State and Federal regulatory reporting requirements for ambient air quality and meteorological monitoring programs. Responsible for daily acquisition (via telemetry) of all monitoring station digital data, preparation of daily data summary reports in support of field operations management, receipt, organization and archival of all supporting data shipments from the field, and subsequent data analysis and reporting for all currently operating air quality and meteorological monitoring programs.

EXPERIENCE

Some selected project experience includes:

Wind Developer: Data Manager for meteorological monitoring programs conducted by Enviroplan Consulting at sites in the Midwest and in Alaska to collect meteorological data for wind resource analyses.

NiSource: Data Manager for collection of meteorological and air quality monitoring data over a 20 year period. Project included seven meteorological towers (of which the three tall towers are currently in operation) including four at 10 meters, two at 200 feet and one at 300 feet. All included wind direction and wind speed with measurements at multiple levels on the 200 and 300 foot towers. In addition, barometric pressure and temperature are measured on the three tall towers.

Orange and Rockland Utilities, Inc.: Data Manager for SO₂ and meteorological monitoring data, including the analysis, reduction and validation of this data. Supervised the preparation of the data and prepared monthly, quarterly and annual reports to be submitted to state agencies and the client. Under Air Guide 19 requirements, responsible for weekly contact with New York State Department of Environmental Conservation (NYSDEC) for transmission of Quality Assurance data check information. Supported NYSDEC real-time data acquisition system by retrieval and transmission of network data during NYSDEC system downtime. Assured that calibration data was current, valid and correctly applied to the data sets. The network consisted of twelve remote SO₂ stations, four remote meteorological stations and a 100-meter meteorological tower at a base station. Data was gathered through a real-time computer-based data acquisition system utilizing radio telemetry with back-up strip chart recorders for missing digital data and validation purposes.

Central Hudson Gas & Electric Corp.: Data Manager for SO₂, NO-NO₂-NO_x, PM10 and meteorological monitoring data, including the analysis, reduction and validation of this data. Responsible for the preparation of monthly and semiannual reports submitted to the client and NYSDEC.

E.I. DuPont de Nemours & Co., Inc.: Data Manager for SO₂, NO-NO₂-NO_x, PM10, TSP and meteorological data and the receipt, organization and analysis of laboratory results of air toxics data, including VOCs, SVOCs, metals, EOM and Dioxins and Furans. Responsible for the preparation of monthly and quarterly reports submitted to the New Jersey Department of Environmental Protection (NJDEP) and DuPont. Developed spreadsheet-based tabular and graphic data reporting formats for over 70 speciated target compounds as analyzed from samples obtained at each of four monitoring site locations. The custom reporting format allowed graphic correlation of the various data sets, enhancing user analysis and presentation of the monitoring program findings.

CIBA GEIGY Corporation: Organized methanol and epichlorohydrin in-vent sampling data for batch processes. Responsible for executing the computer program to organize data into report format. Subsequent review of data to quality assure final results.

Has served as Data Manager for monitoring programs conducted by Enviroplan Consulting on behalf of numerous other companies.

Responsibilities include staff oversight and management for monthly analysis and data reduction of pollutant sampling, including SO₂, NO_x, CO, O₃, TSP, PM10, methane and non-methane hydrocarbons, air toxics pollutants, and various meteorological parameters. Review of data to quality assure final results. Preparation of monthly, quarterly and annual reports, including PARS, statistical analysis, quality assurance data, wind roses, frequency distribution, data collection efficiencies, moving and non-moving block averages, discussion of the data with respect to regulatory compliance standards, and executive summaries.

EDUCATION

M.A., Environmental Studies, Montclair State College
B.S., Biology, St. Peter's College

DANIEL V. STEEN, P.E.

AREAS OF SPECIALIZATION

Mr. Steen is a Senior Principal at Enviroplan Consulting where his primary focus is consultation on planning and design of compliance options for greenhouse gas emission limitations. Following his retirement in 2009 as Vice President, Environmental of FirstEnergy Corporation, one of the largest electric utilities in the United States, he joined Enviroplan Consulting on a part time basis. He is former Chair of the Global Climate Change Subcommittee of the Edison Electric Institute. Mr. Steen has extensive experience negotiating power purchase agreements between electric utilities and wind developers.

EXPERIENCE

As Vice President, Environmental for FirstEnergy, Mr. Steen was responsible for developing environmental protection strategies that complied with laws and regulations pertaining to all of the company's generation and T&D facilities in Ohio, Pennsylvania, and New Jersey. He played a key advising role regarding the operation and maintenance of environmental systems throughout the company. He was responsible for technical research including clean coal technology demonstrations.

Mr. Steen directed a variety of air pollution compliance studies from 1987 through 2009, beginning with Title IV acid rain compliance studies for both Phase I and Phase II of the 1990 Clean Air Act Amendments. He oversaw FirstEnergy compliance studies for the generation fleet (coal, gas, nuclear, and pumped storage hydro) for the Ozone Transport Assessment Group (OTAG). He participated in compliance option evaluations for the Clean Air Interstate Rule (CAIR) and the Clean Air Mercury Rule (CAMR). Both rules have been the subject of significant litigation.

Over the last twenty years Mr. Steen served on numerous industry committees concerning environmental issues. From 2005 to 2009 he chaired the Global Climate Change Subcommittee of the Edison Electric Institute. He was also Vice Chair of the Electric Power Research Institute (EPRI) Environment Council and chair of EPRI's Environmental Delivery and Applications Committee. Mr. Steen was a member of the Pennsylvania Alternative Energy Advisory Council that helped establish the recommended requirements for alternative energy for electric utilities. Until his retirement he was a Board Member of both the Electric Power Generation Association and the Pennsylvania Resources Council and a member of the Environmental Executive Advisory Committee of the Edison Electric Institute.

Mr. Steen began his career as a co-op engineer at Ohio Edison Company in 1966, which merged with Centerior Corporation in 1997 to form FirstEnergy. He has held a variety of engineering and management positions, including substation design, transmission and power supply planning, and power plant operations. He was assistant plant superintendent at the coal-fired, five unit, R.E. Burger Plant in Shadyside, Ohio from 1984 through 1986 where his responsibilities included mechanical maintenance, electrical maintenance and supply chain. Mr. Steen was promoted to Director of the Environmental Department in 1997 and named Vice President, Environmental in 2005.

PROFESSIONAL CERTIFICATION/DEVELOPMENT

Completed Program for Executive Development at Northwestern University's Graduate School of Management.

Graduate of Advanced School of Power Systems Engineering conducted by Westinghouse/Penn State.

Completed International Environmental Compliance Program sponsored by Westinghouse.

PUBLICATIONS

Various papers and presentations primarily concerning clean coal technologies, air pollution control, and carbon capture and geologic sequestration.

EDUCATION

B.S. Electrical Engineering, University of Akron, 1969

Juris Doctorate, University of Akron, 1972

AFFILIATIONS

Registered Professional Engineer, Ohio

Licensed Attorney, Ohio

TANYA WHITE

AREAS OF SPECIALIZATION

Ms. White has conducted several wind resource analyses in support of wind energy projects. She is proficient in using WindPRO to estimate the energy yields for land areas based on the wind resources, orography, and surface roughness of that area. She also is proficient in creating visualizations of wind farms and performing flicker, visibility, and noise impact studies and conducting economic analyses of proposed wind energy facilities using WindPRO. She is also proficient in evaluating the radar interference impacts of proposed or existing wind energy facilities.

Ms. White has extensive experience preparing emissions inventories for various types of GHG emitting sources and emission units, including electricity and heat generating units, fossil-fuel industries, fugitive releases such as venting and flaring from fuel production and leaks from pipes, and industrial processes sector. To date Ms. White has prepared over one-hundred emissions inventories for various types of industries. Ms. White also assisted in developing a training program in GHG emissions inventory development and verification for assessment teams from ANSI who will accredit independent bodies in the verification of GHG emission assertions. Ms. White has also performed research on the topics of carbon credits and Renewable Energy Certificates.

Ms. White has over four years of experience in air quality and air permitting consulting across a broad range of industries. Ms. White has developed numerous construction/operating/renewal permits for minor and major sources in several states including Indiana, Kentucky, and New Jersey. She also has extensive project experience performing air regulation applicability and compliance determinations, and calculating potential and allowable emissions.

WIND ENERGY DEVELOPMENT EXPERIENCE

Ms. White is certified in WindPRO, a comprehensive software package for design and planning of wind energy projects. Ms. White is also certified in MAPINFO Professional, a Geographical Information System (GIS) computer software package.

Performed visual impact studies for a proposed wind farm in New York. The purpose of the studies was to give visual impressions of the proposed wind farms. The renderings were included in the client's environmental impact statement that were presented to various government agencies and stakeholders. Performed similar visual impact studies for a proposed wind farm in Texas.

Performed wind resource assessments, wind feasibility studies, noise, flicker, shadow, and data analyses including economic analyses for an electric utility company in Indiana for two proposed wind farms.

Performed a wind resource prospecting and feasibility analysis for a wind developer in Puerto Rico.

AIR POLLUTION PERMITTING EXPERIENCE

Indiana Department of Environmental Management (IDEM) and Kentucky Division for Air Quality (DAQ): Permit reviewer for Enviroplan Consulting assisting the state agencies in issuance of construction and operating permits for various minor and major sources. Project involves the review of permit applications for completeness and technical accuracy, calculating potential and allowable emissions, conducting regulatory reviews, compliance assessments for applicable state and federal regulations, NSPS and NESHAP applicability determinations, issuing draft and final permits, compliance monitoring requirements, testing, record keeping, reporting requirements and responding to comments after the formal public notice period.

Private Industry:

Japan Airlines Management Corporation (New York): Project involved preparation of emissions inventories that were submitted to the New York State Department of Environmental Conservation (NYSDEC). Additionally, information prepared in the emissions inventories was used to complete annual compliance reports that were also submitted to the NYSDEC.

Fisk Alloy Wire, Inc. (New Jersey): Project involved a review of air regulations to determine the applicability of state and federal air pollution regulations to a proposed electroplating line. This information along with potential to emit calculations were used to prepare a preconstruction permit and operating certificate application that was submitted to the New Jersey Department of Environmental Protection.

FirstEnergy: Conducted extensive analyses of PM_{2.5} ambient monitoring data and the conditions under which the highest 24-hour PM_{2.5} concentrations occurred in the Cleveland Nonattainment Area for 2004 to 2007 to see which concentrations should be excluded in calculating Design Concentrations for comparison to the national Ambient Air Quality Standards under the U.S. EPA Exceptional Events Rule.

PUBLICATIONS

Ellis, H.M., Pan, S., Pinto, A.A, Shannon (Handley), J.C., and White, T.L. (2009) "Summary of State Activities Including Control Strategies and Modeling Plans to Attain the New 24-Hour PM_{2.5} NAAQS". Presented at the EUEC Energy and Environment Conference, February 2-4, 2009.

Ellis, H.M., Manousos, P., Pan, S., and White, T.L. (2009) "Electric Power Company Strategy for Attaining the 24-Hour PM_{2.5} NAAQS by using the U.S. EPA Exceptional Events Rule". Presented at the EUEC Energy and Environment Conference, February 2-4, 2009.

Ellis, H.M., and White, T.L. (2008) "Economic Opportunities of Locating Wind Energy Facilities in the Vicinity of Existing Electric Power Plants". Presented at the EUEC Energy and Environment Conference, January 2008.

Ellis, H.M., Pinto, A.A., Shannon (Handley), J.C., White, T.L. (2007) "Changes in State and Local Air Pollution Compliance Practices Due to Increased Title V and Other Permit Recordkeeping and Reporting Requirements". Presented at the Air & Waste Management Association 100th Annual Meeting, Pittsburgh, PA, June 22-24, 2007.

EDUCATION

B.S., Double Major in Environmental Science and Physical Geography, Saint Mary's University, Nova Scotia, Canada, 2003.

TRAINING COURSES

Title V Air Permitting, Emissions Statements using RADIUS, Fundamentals of Air Dispersion Modeling using ISC3 and AERMOD, and wind resource modeling using WindPRO.